Understanding Complementary Basic Education in Ghana

Final Impact Evaluation

Department for International Development

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In association with:

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Abbreviations

CBE	Complementary Basic Education
DFID	Department for International Development
DID	Difference in Difference
EDT	Education Development Trust (previously known as CfBT)
EFA	Education for All
EGMA	Early Grade Mathematics Assessment
EGRA	Early Grade Reading Assessment
GES	Ghana Education Service
GoG	Government of Ghana
HPB	High Performing Boy
HPG	High Performing Girl
IP	Implementing Partner
LPB	Low Performing Boy
LPG	Low Performing Girl
MoE	Ministry of Education
MU	Management Unit
OOSC	Out of School Children
PCA	Principal Component Analysis
SDG	Sustainable Development Goals
SfL	School for Life
ToC	Theory of Change
ToR	Terms of Reference

Executive Summary

This document represents the final research report for the two-year longitudinal, mixed-methods study of the Complementary Basic Education (CBE) programme in Ghana, commissioned by the UK Department for International Development (DFID). This report provides a synthesis of the key findings of research into the impact of CBE on boys and girls in communities in northern Ghana. In measuring the final impact of the CBE programme in this final report, we have placed particular emphasis on the evidence of the educational trajectory of a cohort of students (cycle 4, academic year 2016/17)[1] from the beginning of their 9-month CBE schooling to the end of their first year in primary school. Overall, the research aimed to provide evidence on the learning outcomes and progress for out of school children who participated in the programme, as well as the extent to which it prepared its graduates for successful transition into public school. In addressing these issues, the research was driven by two key questions:

1. What are the educational trajectories of CBE learners during their 9 months in CBE centres and when they transition to public schools. How do they differ by gender?
2. How, and to what extent, do the learning experiences of CBE graduates equip them for transitioning successfully into public schools and how far do these experiences differ by gender?

Following an Introduction in Section 1, Section 2 outlines the background and context of CBE and this impact study, as well as a summary of the evaluation methodology, Section 3 presents an overview of the findings of quantitative research. During the academic year 2016/17, children enrolled in the CBE programme demonstrated sustained improvements as measured by the difference in literacy and mathematics tests scores between the end and the beginning of the programme. There were large reductions in the proportion of children who were not able to undertake any literacy or numeracy tasks and also for those who were considered beginners. The greatest improvements were shown for children who were considered "proficient" or who managed to perform around 75% of the literacy and numeracy tests. Upon transition into public school, we found a decline in literacy and mathematics skills which was mostly explained by two factors. The first factor is attributed to differences in language of instruction between mother tongue used in the CBE programme and the official language used by Ghanaian Education Services for early primary grades. The second factor is attributed to regional differences, which also compound poverty differentiations across the regions where the CBE programme took place.

Important to note, however, is that during the transition into public schools, we successfully matched CBE children who transited into public schools with corresponding children in public schools who were attending the same grades, matched by gender and age. During the first month of the transition, children who completed the CBE programme and their corresponding matched children (non-CBE) in public schools were tested in basic literacy, numeracy and English. Our results demonstrated comparable results in mathematics test scores between CBE and non-CBE children. CBE children outperform non-CBE children in mother tongue literacy, but non-CBE children slightly outperform CBE children in English competencies. Overall, however, our results demonstrated that we have captured a potential comparison group for CBE children which is used to estimate the relative improvement of CBE children for one year in public schools.

Overall, results show that CBE children's learning progress over the course of one academic year was comparable to that of Non-CBE children already within the public education system therefore demonstrating successful transition and adaptation to the demands of public school. For instance:

- In local language literacy CBE children were able to show overall learning gains that matched those of Non-CBE children as well as higher proportions of students who were able to achieve above 50% overall in their assessments.

[1] The Terms of Reference (ToRs) proposed tracking of Cycle 3 CBE students. After careful consideration, we agreed to focus on Cycle 4 for the tracker survey as it was preferable in determining CBE's value-added in terms of learning achievement as well as progression into formal schools. By tracking a cycle prior to their entrance to formal school and collecting data on their current learning experiences prior to their transition, we were better able to understand the factors which impact this transition.

- In respect to English, CBE children's performance matched that of Non-CBE at the start of the public school year. By the end of the academic year, however, differences between raw subtask scores, zero score reductions and component scores revealed slightly stronger progress for CBE learners, a finding modestly significant at the 5% level. These scores are explained further in Section 3.
- For numeracy, a similar pattern of results to that of English, was observed. Though there were not statistically significant differences in mathematics test scores between CBE and non-CBE learners at the beginning of the academic year in public schools, ,by the end of one academic year, CBE children revealed greater progress, as evidenced by higher change scores across all subtasks and component scores as well as larger reductions in zero scores.

Section 4 presents evidence from a mixed methods study of the learning gains and experiences of CBE graduates during their transition to formal schools in 15 districts of northern Ghana. The use of qualitative research into the experiences of CBE graduates at formal schools, alongside quantitative approaches that measured their learning gains and outcomes, enabled an in-depth and holistic understanding of the impact of the CBE programme on different groups of CBE graduates, thus providing nuance to the findings from Section 3.

Quantitative data indicated that the CBE cohort performed well in local language literacy in public schools with high performing CBE graduates maintaining progress but low performing boys and girls (LPBs and LPGs) showing a drop in performance. In English, high performing CBE graduates made good progress and demonstrated well above average levels of performance in English, while low performing boys and girls demonstrated lower rates of progress. The CBE cohort showed better performance in Numeracy than in Literacy during CBE and in their transition to public schools. Minimal differences were noticed between low performing boys and girls in learning achievements in public schools with both groups showing little learning gains. The results of high performing boys and girls (HPBs and HPGs) in English showed no difference between those who transitioned into a school where language of instruction differed from their mother tongue and those who did not.

Qualitative data illuminated the classroom experiences of these groups which help to explain their notably different learning outcomes. Hence lesson observations and interviews with HPB and HPGs demonstrated their positive attitudes to learning across a range of subjects observed, including English, Maths, Science and Religious and Moral Education. Both groups showed high levels of enthusiasm and participation in learning routines. Both groups were observed to gain confidence from the affirmation they received from teachers and other pupils as a result of offering or modelling correct answers and being applauded via "clapping". Both these groups demonstrated a successful ability to navigate the tendency of classroom instructional procedures in public schools to privilege those able to offer correct answers to closed questions. They almost all expressed a positive sense of making progress in their public school and took pride in their learning achievements. In this sense they recognised themselves as successful learners and appreciated that they felt recognised as such by their teachers at public school.

By contrast, LPBs and LPGs demonstrated high levels of disengagement from learning, distracted behaviours and poor relationships with teachers which may account for very little progress in learning outcomes made by these groups. Both groups demonstrated a reluctance to participate in answering teacher led questions or listening to teacher's instructions. However, from interviews during which these groups reflected on their classroom experience, it was evident that LPGs were the most marginalised from the instructional routines of public schools. They demonstrated not only patterns of social withdrawal but also anxiety and frustration at their inability to understand or successfully participate in answering questions, resulting in classroom experience which they found hurtful, exclusionary and sometimes embarrassing. Teachers in formal schools made few attempts to support LPGs and LPBs.

Qualitative data also yielded insights into the ways in which CBE graduates were able to draw on their prior learning in CBE when studying English, Numeracy and local language literacy in public classrooms. For instance, all learners, including high and low performers of both genders, expressed positive attitudes and confidence in their ability to engage in Mathematics lessons in public school. This was based on the continuities they recognised with their prior CBE experience and their ability to apply and repurpose skills they had developed. Moreover, learning successes in local language literacy revealed by quantitative data align with the enthusiasm for learning local languages expressed by all groups of CBE graduates. This was based on their valuing of the personal, social and cultural confidence and improved status in their communities which they believed had resulted from this CBE experience. Furthermore, the positive learning outcomes in English demonstrated by high performing

CBE graduates aligns with the insights from lesson observations and interviews. These revealed that they were not only able to but also took delight in repurposing language learning skills, in particular syllabic and phonetic methods which they had developed when learning their local language while also learning English in the formal school setting. It also demonstrates their confidence in making using of the literacy skills acquired through mother-tongue instruction in learning to read and learn in a second language.

Interviews with CBE graduates about their attitudes to transitioning to formal schools indicated that for the majority this was a positive experience, made easier by their prior enjoyment of learning experienced during CBE; and the similarity they recognised between the instructional methods and lesson structure of CBE and formal school. While low performing boys and girls demonstrated more negative attitudes, for both groups the opportunity to enjoy community-based friendships when they attended formal school was a key dimension of its appeal. However, challenges faced by all groups included the requirement to wear school uniforms, regular hunger, as well as combining attendance with household chores or farming demands. While most families were enthusiastic to support their children's transition, noting that CBE had in some cases transformed their attitudes to their children's learning, many expressed anxieties about affording the costs of uniforms, school fees and learning materials.

Section 5 concludes the report by highlighting the key messages and policy implications of these findings. It draws attention to the:

- Significance of this report in providing rigorous research evidence for the positive impact of CBE in supporting the transition of out of school children to public schools;
- "Staying power" of the CBE experience and in particular its ability to provide graduates with skills, learning strategies and confidence which they can use and repurpose in public schools;
- Importance of building on the enthusiasm of communities and addressing the concerns and challenges they face;
- Importance of local language learning as the main medium of instruction in lower primary
- Need to ensure targeted pastoral and pedagogical support for low performing boys and girls who transition into public schools;
- Need for teachers in formal schools to develop their pedagogical practices to take account of the distinct needs of lower achieving CBE graduates;
- Need to integrate CBE into national and district level education improvement strategic plans, if not already integrated;
- Importance of a commitment to the extension of CBE to all areas with out of school populations to ensure Ghana meets the Sustainable Development goal of providing access to equitable quality education for all.

1. Introduction

This document represents the final research report for the two-year study of the Complementary Basic Education (CBE) programme in Ghana. The longitudinal, mixed-methods study, commissioned by the UK Department for International Development (DFID), focuses on the 5-year, DFID/USAID funded programme which aimed to ensure out-of-school-children (OOSC) have access to basic education in 5 regions and 50 districts primarily in the Northern Region of Ghana. In partnership with the Government of Ghana (GoG) the programme, managed by Crown Agents and its partners: Associates for Change and Education Development Trust (EDT), previously known as CfBT, worked through 10 Implementing Partners (IPs) which provided the opportunity for OOSC to transition into mainstream public education following 9-months of accelerated learning instruction within IP-led CBE Centres.

As noted in the Inception Report outlining the scope and aims of the impact evaluation, the research aimed to provide evidence on the learning outcomes and progress of out-of-school-children who had participated in the programme, as well as the extent to which it prepared its graduates for successful transition into public school[2]. In doing so, it addresses a major knowledge gap both in understanding of the impact of CBE on out of school children in terms of their learning, ability to integrate into public schools, and also in relation to the commitment of families and communities to support their transition into the public school system at the end of CBE.

This report provides a synthesis of the key findings of research into the impact of Complementary Basic Education (CBE) on boys and girls in communities in northern Ghana. Thus, this final impact evaluation focused on the tracking of CBE students from the beginning of their CBE to the end of their first year in primary school. Other studies on the CBE programme are presented in other reports listed in the References Section at the end of this report. This final impact evaluation report is based on quantitative data which tracked the learning outcomes of students during their 9-month CBE programme, as well as their progress when they transitioned to public school. This was supplemented by qualitative data which aimed to make sense of these findings by illuminating the in-depth learning experiences of CBE graduates in CBE and its impact on their resilience in public school, as well as their relationships with teachers and other pupils when they transitioned to public school. It was particularly important to highlight the diverse experiences of the different groups of CBE students rather than treating them as a homogenous collective, hence the concern to investigate the differential impact on boys and girls, as well as high and low performers. In other words, the research aimed to provide understanding of "what is working in relation to the CBE programme, why and for which groups of CBE learners".

In addressing these issues, the research was driven by two key questions:

1. What are the educational trajectories of CBE learners during their 9 months in CBE centres and when they transition to public schools. How do they differ by gender?
2. How and to what extent do the learning experiences of CBE graduates equip them for transitioning successfully into public schools, and how far do these experiences differ by gender?

This report brings together the key findings of different strands of the research in answer to those overarching questions. The report therefore includes:

Section 2: An overview of the CBE programme background and the context of our research project. This section also gives an overview this impact study's research design, methodology, ethical considerations and research limitations.

Section 3: An overview of the findings of quantitative research which tracked the progress and learning outcomes in local language literacy, English and Mathematics of children from CBE learning centres in public schools by comparison with a comparable group who were not part of the programme.

Section 4: An overview of the findings of a mixed methods study into the learning outcomes and experiences of high and low performing CBE graduates of both genders during their first year at public

[2] The ToRs proposed tracking of Cycle 3 CBE students. After careful consideration, we agreed to focus on Cycle 4 for the tracker survey as it was preferable in determining CBE's value-added in terms of learning achievement as well as progression into formal schools. By tracking a cycle prior to their entrance to formal school and collecting data on their current learning experiences prior to their transition, we were better able to understand the factors which impact this transition.

school. This draws on qualitative findings to probe the experiences of CBE graduates in public schools to explain and understand their progress in local language literacy, English and Mathematics. This section therefore adds another layer of explanation of the impact of CBE through exploring how public school was experienced by CBE graduates and the extent to which their prior learning was useful and relevant to support their successful integration.

These sections connect together to highlight different dimensions of the impact of CBE, firstly drawing on quantitative data to identify the progress of CBE graduates as a group in comparison with Non-CBE graduates; and secondly using qualitative as well as quantitative data to provide a holistic as well as rigorous understanding of the learning and experiences of boys and girls, high and low performing CBE graduates when they transition into public school.

This synthesis report therefore moves from reporting on a comparison of the collective learning achievements of CBE by comparison with Non-CBE students in public schools, to presenting the findings of a more nuanced and differentiated mixed methods research focus on the achievements and experiences of specific groups of CBE graduates from the start of CBE through to the end of their first year in public school. In doing so it offers an evidence informed and multi-layered story of the impact of CBE as an educational intervention aiming to assist out of school children acquire basic literacy and numeracy competencies, and to support their transition into public schools.

Section 5: The policy and programming implications arising from the findings in Sections 3 and 4 are presented in Section 5. These indicate how the findings might inform national policy dialogue and support as well as inform districts on how they can improve access to basic education for CBE graduates in their communities.

2. Background, Context and Methodology

2.1. Background of the CBE Programme and the Context of the Research Project

In the last three decades, many sub-Saharan African countries including Ghana have made considerable strides towards achieving Education for All (EFA) goals, but stagnating net enrolment rates, high dropout rates and pervasive social and economic inequalities continue to plague the education system. The most challenging issue facing Ghanaian education is the proportion of out-of-school children (OoSC) and as identified in very recent studies, the over-age children phenomenon. There have been credible efforts to address these challenges, including the important contribution of non-state actors through CBE initiatives.[3]

From 2012 to November 2018 the UK and US Governments provided £27.9 million to support the Government of Ghana (GoG) to: (i) ensure that 200,000 OoSC have access to complementary basic education (CBE), with a focus on girls in particular, and: (ii) build the capacity of government to make CBE a sustainable approach to achieving universal primary enrolment; and (iii) provide evidence on the long-term outcomes for out-of-school children that participate in CBE programmes and the barriers and sustainability of the programme.

To achieve these goals a CBE Management Unit (MU) – consisting of Crown Agents and its partners: Associates for Change and Education Development Trust (CfBT) – was established to provide technical support to 10 IPs who have been sub-contracted to implement CBE at district level and support the MoE and Ghana Education Service (GES) to make CBE an integral part of the strategy to improve access to education. The CBE programme operated in 5 regions and 50 districts primarily in northern Ghana.

The CBE Programme supported 5 cohorts of students from distinct academic years (October – May), also referred to as Cycles. Cycle 1 refers to the academic year 2013/14; Cycle 2 to 2014/15; Cycle 3 to 2015/16; Cycle 4 to 2016/17; and Cycle 5 to 2017/18.

The CBE programme aimed to provide an opportunity for OoSC to be reintegrated into mainstream public education after 9 months of accelerated learning instruction. By targeting OoSC, it is expected that this will increase enrolment at primary level of children in the areas where CBE is implemented. Ultimately, the expectation is that Regional Gross Primary Enrolment Rate will increase as OoSC are reintegrated into formal schools. The intervention is community driven and based on the assumption that evidence of children learning, will motivate communities to support their children to continue in education, beyond the nine-month accelerated learning programme into formal education.

Thus, the intervention entails transition of CBE graduates into government formal schools to continue their education. Although the expectation is that CBE graduates will continue and complete their basic education, the precise nature and wider benefits, in terms of school retention, reduced drop out, learning outcomes, and successful transitions into further schooling or the labour market had not been investigated.

2.2. Background and Context to Research Design

Prior to our 2-year research study, there was a distinct lack of data supporting a systematic, longitudinal approach to assessing the manner in which CBE graduates are assessed, integrated in the formal school system, and how their progress is tracked. As the structures of CBE and formal education are inherently different, it was key to examine how these students cope with the documented challenges of

[3] In the Inception Phase of this project, we undertook a critical review of academic and development agency literature relating to implementation of CBE programmes with a focus on northern Ghana. The review explored the different situational contexts that necessitate CBE intervention, and its successes and challenges. It begins with an overview of the need for CBE, focusing on CBE in Ghana, namely School for Life (SfL) (a sub-component of CBE in Ghana) and the current CBE programme, and examines the successes, challenges and opportunities for continued impact. It also discusses CBE in relation to demand and supply side barriers commonplace in northern Ghana and then summarises key issues highlighted in our research. This is outlined in the CBE Inception Report, (Akyeampong, Rose and Sabates: 2017).

the formal education system and how this contrasted with students who are not beneficiaries of CBE programmes.

As such, DFID published an invitation to tender for the evaluation of the CBE Programme. Following a successful tender, IMC Worldwide was commissioned to undertake the comprehensive research programme with our consortium consisting of research partners: University of Cambridge, the University of Sussex and RTI International, and our Ghanaian data collection partners: JEAVCO Associates and PAB Consult.

We carried out a 5-month Inception Phase, from September 2016 – January 2017. During this period, key stakeholder meetings[4] were carried out in Accra to inform the research design and methodology. This consisted meeting with DFID Ghana and the CBE MU to discuss expectations, review initial research strategy and workplans, as well as agreeing on the sampling frame for the research. We also benefitted from a discussion with the CBE MU regarding previous studies on CBE in Ghana, project implementation progress and challenges. The visit concluded with a half-day workshop with DFID Ghana, CBE MU and GES to present a revised Theory of Change (ToC) for the CBE programme, see Appendix E.

Key stakeholders were also involved throughout the implementation of the research project. All reports were shared with DFID and the CBE MU to inform current and future programming. In addition to this, the GoG Ministry of Education (MoE) was informed of our ongoing policy recommendations and this culminated with a final research and lesson learning dissemination workshop held in Accra on the 11th – 12th September 2018. We presented the main research findings at the Ministry of Education to the Minister of Education, Deputy Minister of Education, the Chief Director and other key officials on 11th September 2018. This presentation and discussion provided a space for the Ministry to share their thoughts on the main findings and to engage in dialogue with us regarding the policy implications. A one-day dissemination workshop was organised for the following day. It was attended by over 80+ participants including implementing partners, the CBE MU, development partners, key Ministry of Education and Ghana Education officials. Participants were able to engage with the implications of the findings and reflect on the lessons for sustaining CBE in Ghana. The workshop concluded with the Government of Ghana committing 1% of its education budget on extending CBE with the aim of reaching all out-of-school-children in Ghana.

2.3. Methodology of the Impact Evaluation

2.3.1. Overview

The primary audience for this research is DFID, USAID, the GES/ MoE, CBE Management Unit, IPs, and other development partners. It is expected that the research provides a useful evidence base which can contribute to future decision-making about expanding and mainstreaming the CBE in the Ghanaian Education System. However, in telling the final impact story of CBE, we based our evidence on the Cycle 4 cohort, as this was the only cohort in which we collected data from beginning of their CBE to the end of the first year of primary school. The methodology reported here focuses on tracking of Cycle 4 students in CBE centres, and into formal schools

Therefore, in order to evaluate the final impact of the CBE programme, we undertook quantitative and qualitative tracking of CBE students who transitioned to formal school in 2017/18 – Cycle 4.Our aim in tracking Cycle 4 CBE students was to understand the CBE programme holistically, including its pedagogy, transition of graduates into formal school, and its impact on learning after transition into formal schools. To do this, we undertook a qualitative exploration of the CBE pedagogy which enabled us to understand the approach used in classrooms intended to provide key skills to CBE learners[5]. We also followed Cycle 4 CBE learners longitudinally in order to capture their learning gains at the end of the CBE cycle, and their transitions into the formal school. We compared learning experiences as well as learning outcomes to other children who are already in formal schools who served as our control group. We undertook further analysis into the factors that foster successful learning after the transition into formal schools.

[4] It was crucial throughout our research to adhere to the Paris Declaration Principles of Aid Effectiveness (2005), as such we involved the GoG MoE and GES from the outset to ensure that the Government's strategy was in mind when recommendations were made to allow for greater ownership. CBE was developed specifically to be an integral part of the Government's strategy to improve access to education, and the inclusion of local language in CBE schools was an important part of that strategy.

[5] Further details on the CBE Pedagogy can be found within our stand-alone Pedagogy Report: Akyeampong, K. (2018). *Understanding CBE in Ghana: An Analysis of the CBE Pedagogy in Ghana*.

The CBE programme design recognised that not all learners learn at the same pace and stressed the need for facilitators to pay attention to the learning needs of different students. Therefore, in our research design we wanted to understand how Cycle 4 students make progress at different levels of learning and achievement, especially on whether the CBE programme is able to address the learning needs of low achievers by gender. Hence, we introduced the following categorisation to explore the CBE programme impact: High Performing Boys (HPB); Low Performing Boys (LPB); High Performing Girls (HPG); and Low Performing Girls (LPG). We also used this categorisation in exploring the learning experience of CBE students in our classroom observation research, so we could use this to provide further insights into differential performance by gender at the end of the first year of primary school for the Cycle 4 students (our tracking study group).

2.3.2. Tracking Cycle 4 – Sampling Strategy

For CBE learners who were in Cycle 4, a sample size of 2,500 learners was selected and followed longitudinally for 4 periods of time. During the first two time periods, the main data collection for this cohort was to be a learner assessment combined with a child survey which collected information on previous educational experiences, educational attitudes and some socio-economic and demographic background characteristics.

The CBE Cycle 4 children were followed longitudinally after the transition into primary school. A sample of non-CBE learners who were enrolled in the primary schools where CBE learners transition were selected as a comparison group. Next, a household survey, together with literacy and numeracy tests as well as school information was collected to respond the research questions of the tracking component. This is explained in further detail in Section 3.1.1.

This quantitative information was complemented with qualitative fieldwork for CBE Cycle 4 learners on the CBE pedagogy and on the transition into primary school.

2.3.3. Cycle 4 Learner Experiences in Public Schools – Methods and Sampling Strategy

The qualitative research approach explored the classroom and wider social experiences of 1 High Performing Boy (HPB), 1 High Performing Girl (HPG), 1 Low Performing Boy (LPB) and 1 Low Performing Girl (LPG) in 12 public schools. These were selected on the basis of CBE facilitator's perceptions as well as data gathered on their achievements and progress in English, Mathematics and their local language during CBE. These were situated in diverse rural communities which were selected to represent the range of community contexts and languages of instruction used in the CBE schools, but not the same as Cycle 4. Informants also included the families of each CBE graduate along with a male and female member of their community.

The table below shows the schools selected with information on the language and dominant faith groups of communities in the different regions.

Table 1: Schools Selected

School	Name	Region	Language	Faith
1.	Bono Manso DA Primary	Nkoranza North	Asante Twi	Christian
2.	Canteen Primary	West Gonja	Gonja	Mixed religion
3	Eremon Danko	Lawra District	Dagaare	Christian
4.	Goriko Primary	Talensi District	Gruni	Christian
5	Gumo Basic School	Sissala West	Sissala	Mixed
6.	LPBun Nsuano	Nkoranza North Primary	Asante Twi	Christian
7	Logri RC Primary	Mamprugu Moaduri	Mampruli	Muslim
8	Tindan DA Primary	Tolon district	Dagbani	Muslim
9	YaLPGu Primary Tinun	Binduri District	Kusaal	Mixed
10	Zamashegu Primary	Gushegu District	Likpakpaln	Christian
11	Zenga DA Primary	Kasena Nakana West	Kasnea Nakana	Christian
12	Nyoli RC Primary	Sawka Tuna Kalba	Brefo	Christian

The table below summarises the research informants. Engaging with the families of CBE graduates, their teachers as well as local community figures enabled the research to elicit the views and vantage points of a range of stakeholders affecting and affected by the process of transition.

Table 2: Research Informants

Group	Number of Informants
CBE graduates	48
Families of CBE graduates	40
Teachers and Headteachers	20
Community figures	20
Total	128

Multiple data gathering methods were used including:

- Lesson observations of CBE graduates in public schools (science, ICT, math – numeracy, English language/reading comprehension, religious knowledge)
    - For each student, observations lasted about 90 minutes.
- Individual interviews with CBE graduates after lessons
- Role play and group discussion and reflection
- Interviews with families of CBE graduates
- Interviews with teachers and headteachers in public schools
- Interviews with community figures

Table 3: Qualitative Methods

Method	Usefulness as Data Source
Lesson Observations of CBE students	• How the CBE graduates experience their lessons in public school • Their attitudes to learning; level of participation in learning tasks and activities; their relationships with teachers and other pupils; their learning gains
Follow up interview based on lesson observation	• Perspectives and feelings of CBE graduate about their experience of learning in a particular lesson • Views on how this experience is similar/different from their CBE experience
Group discussion with CBE graduates (males and females separately and together) after lesson	• As above • Possibility of engaging girls and boys separately as well as together
Semi-structured interviews with CBE graduates	• Perspectives and feelings on their experience of lessons and public school; • How they see the similarities and differences between CBE and public schools; • How they see the usefulness of their CBE experience in navigating and participating in public schools • Challenges • Hopes • CBE personal stories of transition
Role play activity	• CBE graduates were asked to dramatise a CBE classroom and a typical class in their new school; • Followed by group discussion and reflection on their choices and how they presented the similarities and differences between CBE and public schooling • How CBE graduates experience similarities and differences between CBE and public school • Memories of CBE and relevance to public school
Interview with family of CBE graduate	• Strengths and weaknesses of CBE • Perspectives on impact of CBE on their children and wider community; • Views on their child's transition; challenges faced in supporting their child in public school • How CBE could be improved; attitudes to boys/girls' education.
Interviews with teachers and headteachers	• Perspectives of teachers on CBE interventions; • Views on learning needs, difficulties, experiences of CBE graduates; • Views on how they respond to them
Interviews with community leaders	• Perspectives on aims of CBE/ impact of CBE on their communities; • Attitudes to education of boys and girls; • Challenges; views on strengths and weaknesses of CBE in relation to transition.

Various issues and concerns underpinned the data gathering strategy. Firstly, the research team was mindful of the special challenges of inviting young children to share their thoughts and feelings about their experiences of schooling and their memories of CBE provision. Hence a key priority was to build positive relationships with them and their families. Two Ghanaian researchers - one male and one female, selected in part for their fluency in the local language of school communities spent 4 days in each school to interview pupils, their families, community members and teachers. The range of research methods used - including observations, interviews with individuals, role play and group interviews – facilitated several interactions between researchers and CBE graduates which helped to build positive rapport between them. Also important was the decision to use female researchers to engage with CBE girl graduates, given local cultural and social norms which indicated that girls were more likely to be at ease with a researcher of their own gender. Moreover, many interviews involved researchers visiting the homes of CBE graduates, also facilitating friendly relationships as the context for data gathering.

Secondly, we were aware of the need to use child friendly creative data gathering methods to elicit children's views. Hence the use of role-play as described above. This gave the CBE graduates an opportunity to concretise their thoughts and feelings about CBE and public schooling, complementing interviews with them. This was a fun activity through which to generate further discussions and reflections.

Thirdly, data gathering mixed observation with interviews and role play, thus providing a number of entry points into capturing their experiences in public schools. Observations showed what CBE pupils actually do and say in lessons while subsequent interviews and roleplays yielded insights into their feelings, thoughts and memories of prior experiences. They enabled the research to capture their current experiences in public schools but also how they construed that experience in relation to their previous CBE experience. Both strategies recognised CBE graduates as active participants in the research process and agentic in their responses to their shifting educational environments

Finally, it should be pointed out that the opportunity for researchers to spend 4 days in each school community helped to build an embedded understanding of how CBE's attendance and experience of public school fitted into their everyday lives and realities. Hence the research methods used reflected the broader approach in aiming to spotlight the intersections between the learning experiences and trajectories of CBE graduates, their family and community environments.

2.3.4. Overall Ethical Considerations

As with all research there must be ethical considerations and this is especially pronounced when engaging with young children. Throughout the research we adhered to DFID Ethics Principles for Research and Evaluation (2011), as well as drawing on the best practice and experience of our research team over decades of education research. To do this, our team:

- Secured necessary ethical approval for this research from University of Cambridge, University of Sussex and the CBE Management Unit.
- Designed the research in accordance with 'Do No Harm' Principles which were particularly important given children are a vulnerable group. The risk of harm was most prevalent in our qualitative research given the special challenge of inviting children to share their thoughts and feelings. This was mitigated in various ways as outlined in more detail in the above section.
- Ahead of engagement with the children, the data collection team spent time with communities and families to build vital trust and rapport. As such, communities welcomed the enumerators as friends of the family rather than strangers and were happy to have the team "check on the success of the children". This would not have been possible without the use of two well-respected and experienced Ghanaian data collection firms, with enumerators who could speak in the local languages.
- Designed all research instruments with the DFID Principles in mind, for example, students were introduced to the research project and given an outline of the assessment or interview. At each interaction issues of confidentiality and anonymity were discussed, with permission requested and given to record and assess for the purposes of this research. As such all participants engaged voluntarily and were given opportunities to pass on any activity or withdraw consent completely.
- Saved all data securely according to our data collection protocols to avoid unauthorised access and misuse. All enumerators and researchers were fully briefed on this process. No irrelevant data was collected or stored meaning that all data had a practical value for this research.

2.3.5. Overall Limitations

The overall limitations of the CBE research are outlined in detail below:

- We could not establish causality as is possible using randomised control trials. It was, however, not our intention in the research to establish causality. We acknowledge that we were unable to observe all possible sources of variation and as such this remained a limitation of our analysis.
- We were only able to capture short periods of learning improvements. There may be longer term benefits of the programme which are unobserved or not captured by the current research.
- We limited the definition of learning by using literacy and numeracy and capturing such skills using EGRA and EGMA type surveys. Other forms of assessments could allow us to capture levels of competence according to the national curriculum for example, but this was not possible under the scope of work.
- Whilst we maintained generalisation of results to the level of CBE programme, we were unable to achieve generalisation at the level of Implementing Partner. To do this, we would have required an approach where a representative sample of children within IP providers are then compared against a sample of children in government schools which are within the same region and district as the IP provider. This design would have to be repeated for all IP providers, making the sample size too large for our study.
- We had difficulty collecting data from absent learners or those who migrated. Whilst our enumerators were sent multiple times to capture missing children, we still suffered from sample attrition, but not to the extent that would compromise the robustness of the findings. It was also not possible to discern why learners were absent under our scope of work.
- Our qualitative samples were small in comparison to the quantitative samples. Increasing the samples considerably would have significantly increased field costs due to the labour-intensive nature of qualitative inquiry. Nevertheless, our qualitative samples were sizeable enough to allow us to develop in-depth understanding of how the CBE programme affects different group of learners. Local enumerators can have inherent biases on the subject matter which can affect how data is collected, as well as how it is translated. To reduce the risk of this, all enumerators were trained on how to ensure, and encouraged to report accurately. Supervisors then cross-checked all information to assess potential misreporting of information. Random data quality checks were also provided by the local research partners.

3. Tracking the Progress of CBE Students

3.1. Overview of Results

A sample of children who were part of the Complementary Basic Education (CBE) programme during the academic year 2016/17 (Cycle 4) were followed longitudinally into public schools for the academic year 2017/18. Children who completed the CBE programme were also supported by the programme to make a transition into public schools and were assessed by Head Teachers and allocated to the appropriate grade according to their academic abilities in literacy and numeracy. Once in public schools, the research team collected information – at both the start (baseline) and end (endline) of the academic year – on CBE children and a comparable group of children who were not part of the CBE programme, but who nonetheless have been attending public schools. We refer to this group as Non-CBE children. This section focuses on results from the endline phase of the CBE Cycle 4 Tracker Study and examines differences in CBE and Non-CBE children's learning outcomes between the start and end of their first public school year. The main aim of this section is to ascertain the extent of CBE student's progress, relative to their public school peers, in their first year of public school, with a particular focus on learning outcomes.

3.1.1. Sample

The original sample size for CBE cycle 4 students was calculated to achieve representativeness of CBE provision across regions and language. It is not possible to identify representativeness across language and implementing partners as implementing partners were working in specific regions using particular language of instruction. With a target enrolment of 40,000 students across 2,000 CBE Centres with 10 implementing partners, a representative sample is achieved with 2,099 students. We therefore targeted 2,500 students to take into account attrition. At the beginning of CBE programme, information was collected on 2,402 students and at the end of the CBE programme 2,007 students were re-interviewed. During transition, 1,362 CBE students were followed up into formal school and matched with 1,218 students from public schools.

For the CBE Cycle 4 Tracker Endline Study, 2424 students of the original 2580 (CBE=1362; Non-CBE=1218) from the CBE Cycle 4 Tracker Baseline Study could be reached. This included 1299 CBE students (Male=47.3%; Female=52.7%) and 1125 Non-CBE students (Male=46.7%; Female=53.3%). The average age for both CBE and Non-CBE groups was 10.8 years. In respect to grade level, 44.2% of CBE and 43.3 % of Non-CBE children were in Grades 3 and below with the remainder of the samples in Grades 4 and above. The primary reason why Cycle 4 Tracker Baseline students could not be accessed at endline, according to enumerators, was migration, either for livelihood activities or sending the child to live with another family member. A secondary source of attrition was absence of the child at the time of data collection. This however, was not a common cause as enumerators tried different times of the day to be able to reach as many children participants of the project.

3.1.2. Local Language Literacy, Numeracy and English Assessments

The assessments used for tracking CBE and Non-CBE students' progress were the same as those used in the CBE Cycle 4 Tracker Baseline Study, i.e. the Early Grade Reading Assessment (EGRA), for local language and English, and Early Grade Mathematics Assessment (EGMA) for numeracy. The local language literacy assessment was made up of five subtasks including letter-sound identification, non-word reading, oral passage reading, reading comprehension and listening comprehension. The English literacy assessment consisted of six subtasks which were the same as those for the local language literacy assessment, with the addition of an oral vocabulary test.

EGMA was designed to provide information about basic mathematics competencies—those competencies which should typically be mastered in the very early grades, and without which pupils will struggle, or potentially drop out in later years. The subtasks in numeracy were number identification, single digit addition and subtraction, number discrimination, missing numbers in patterns, two-digit addition and subtraction as well as word problem solving.

3.2. Learner Assessments for CBE and Non-CBE Students

3.2.1. Subtask Comparisons

This section presents the raw score subtask results of the CBE Cycle 4 Tracker Endline assessments, comparing the performance of CBE and Non-CBE students. Baseline results are also included along with estimates of learning gains. This approach allows for an estimate of CBE and Non-CBE students' improvement from the beginning to the end of the first year in public school after transition.

Table 4 shows the overall mean percent scores on the baseline and endline local language literacy, English literacy and numeracy subtasks, as well as the change in scores between the two time points for both CBE and Non-CBE students. Results from Table 4 indicate that the mean percent score for CBE children in the letter identification subtask was 25.8 at baseline and this increased to 52.2% at endline. For non-CBE, the mean percent score was 18.2% at baseline and this rose to 49% at endline. Overall, the increase for CBE students in this subtask was 26.5 percentage points and 30.8 percentage points for Non-CBE students.

Across assessment subtasks, there was a significant increase in the mean scores for students from CBE and Non-CBE demonstrating strong progress from both groups. For baseline results in local language literacy, whilst CBE students demonstrated higher mean scores for all subtask assessments, no consistent pattern of difference was observed for students' progress by the end of the first year in public school, demonstrating largely comparable performance for this area of learning at endline.

In English subtask assessments CBE students were found to slightly underperform relative to their Non-CBE counterparts at baseline. In examining endline results, as well as changes in mean scores, however, CBE children showed stronger performance across all subtasks with significant differences observed for several subtasks including oral vocabulary, reading comprehension and listening comprehension.

On average, higher attainment in numeracy compared with both local language and English literacy was observed in baseline and endline results for CBE and Non-CBE students. Change score results, however, were similar with those of both literacy assessments. Whilst differences between CBE and Non-CBE children were not apparent at baseline, CBE children showed higher endline mean percent and changes scores compared to Non-CBE for all subtasks a number of which reached significance.

Table 4: Differences in subtask performance and progress between CBE and non-CBE

	CBE			Non-CBE		
Subtasks	**Baseline mean percent score (%)**	**Endline mean percent score (%)**	**Change in score (% points)**	**Baseline mean percent score (%)**	**Endline mean percent score (%)**	**Change in score (% points)**
Local language						
Letter sound identification	25.8	52.2	26.5	18.2	49.0	30.8**
Invent word	13.8	39.9	26.1	10.8	36.8	26.1
Oral reading	29.2	59.3	30.1	20.8	54.9	34.1*
Reading comprehension	23.4	54.8	31.4	16.3	50.6	34.3
Listening comprehension	44.9	70.7	25.8	44.0	67.2	23.3
English						
Oral vocabulary	61.1	85.7	24.6***	66.6	84.2	17.6
Letter sound identification	32.1	62.7	30.6	29.8	59.1	29.3
Invent word	17.8	47.3	29.6	16.2	43.9	27.7
Oral reading	36.1	71.0	34.9	37.7	69.4	31.7
Reading comprehension	25.5	61.0	35.6*	26.7	58.7	32.0
Listening comprehension	35.6	73.7	38.1***	38.9	70.0	31.1
Numeracy						
Number identification	46.2	79.3	33.1	44.4	75.6	31.3
Number discrimination	58.7	80.8	22.1	56.4	77.8	21.4
Missing number	43.2	70.7	27.5*	42.1	66.8	24.7
One-digit addition	45.3	77.8	32.5*	44.9	74.9	29.9
Two-digit addition	41.6	77.5	35.9**	42.5	73.9	31.4
One-digit subtraction	40.1	73.7	33.6	39.5	71.6	32.1
Two-digit subtraction	36.8	72.7	35.9	35.9	71.3	35.3
Numeracy word problems	50.2	77.3	27.1**	50.6	72.9	22.4

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

3.2.2. Zero Score Comparisons

In addition to mean percent scores, we compared CBE and Non-CBE student's zero scores at baseline and endline. Zero scores indicate the percentage of students who were unable to correctly answer a single item on a given subtask. Examining both increases in mean percent scores and reductions in zero scores enables a more comprehensive examination of learning progress as well as improvements

for students at the lowest end of the achievement spectrum. Zero score estimates from the baseline and endline assessments, as well as a measure of the reduction in zero scores are shown in Table 5.

Table 5: Differences in the percentage of non-performers at baseline and endline between CBE and non-CBE

	CBE			Non-CBE		
Subtasks	**Baseline percent zero scores (%)**	**Endline Percent zero scores (%)**	**Change in zero scores (% points)**	**Baseline percent zero score (%)**	**Endline percent zero scores (%)**	**Change in zero scores (% points)**
Local language						
Letter sound identification	24.9	12.6	-12.3	36.8	15.5	-21.3***
Invent word	58.5	30.4	-28.2	67.0	34.0	-33.0*
Oral reading	46.7	24.4	-22.3	58.4	28.3	-30.1***
Reading comprehension	62.1	29.6	-32.5	69.7	33.6	-36.1
Listening comprehension	38.0	18.0	-20.0*	37.2	20.9	-16.4
English						
Oral vocabulary	8.4	2.9	-5.6***	4.0	3.2	-0.8
Letter sound identification	16.8	4.7	-12.1	19.0	5.7	-13.3
Invent word	52.0	22.1	-29.8	57.3	23.8	-33.5
Oral reading	35.2	13.0	-22.2	36.2	15.1	-21.0
Reading comprehension	55.5	20.8	-34.7*	51.5	21.6	-29.9
Listening comprehension	47.1	13.7	-33.4***	41.2	14.4	-26.9
Numeracy						
Number identification	10.2	3.5	-6.7***	7.0	4.9	-2.1
Number discrimination	10.4	3.5	-6.9*	9.3	4.8	-4.5
Missing number	13.6	3.6	-9.9**	11.9	5.2	-6.7
One-digit addition	9.0	3.4	-5.7***	6.4	4.4	-2.0
Two-digit addition	29.7	6.8	-23.0***	26.3	9.0	-17.3
One-digit subtraction	11.4	3.9	-7.5**	9.1	5.0	-4.2
Two-digit subtraction	36.0	9.8	-26.2*	33.7	10.4	-23.3
Numeracy word problems	20.4	6.7	-13.7*	18.8	8.0	-10.8

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Across all assessment subtasks, there were considerable reductions in zero scores for both CBE and Non-CBE students' over time. For local language, lower percentages of zero scores were observed at both baseline and endline for CBE compared to Non-CBE across all subtasks. For both groups, the largest absolute reduction in zero scores was in reading comprehension (CBE= -32.5 percentage points; Non-CBE=-36.1 percentage points). The largest relative reduction was for letter sound identification (whereby the total percentage of zero scores for this subtask was reduced to 12.6% for CBE and 15.5% for Non-CBE). Though Non-CBE students showed greater changes in zero scores over time, these figures were relative to their percentages at baseline, which were significantly greater in all subtask instances.

For English, no consistent pattern of difference was observed for frequencies of zero scores at baseline. At endline, however, there were fewer CBE students identified as being unable to answer a single question on subtasks, compared with non-CBE. In regard to changes in zero scores, CBE students also show more significant reductions, on average. Whilst reading comprehension showed the largest absolute reduction in zero scores for CBE students (-34.7 percentage points), for Non-CBE this was found for the invent word task (-33.5 percentage points). For both groups, oral vocabulary showed the largest relative reduction (CBE=2.9%; Non-CBE=3.2%).

For numeracy, a higher proportion of CBE students were found to have zero scores across all subtasks at baseline. At endline, however, this pattern was reversed, with CBE children showing lower frequencies of students identified as non-performers with zero scores. This was also reflected through change scores, with CBE children showing greater and more significant reductions over time for each numeracy subtask assessment marked as zero score. For both groups, the largest absolute reduction in zero scores was found for two-digit subtraction (CBE=26.2 percentage points; Non-CBE=23.3 percentage points).

3.2.3. Component Scores and Proficiency Levels

Table 6 presents the mean percent component scores (beginner, advanced and overall) for local language literacy, English literacy and numeracy assessments at baseline and endline for CBE and

Non-CBE students. It also compares changes over time to ascertain the extent of progress achieved by both groups. Beginner scores in local language literacy and English were calculated using PCA analysis and comprised letter sound identification and invent word tasks whereas advanced scores were derived from oral reading and reading comprehension subtasks. Beginner scores in numeracy were based on number identification, number discrimination, missing number and one-digit addition and subtractions subtasks; advanced scores were derived from word problem as well as two-digit addition and subtraction subtasks.

In addition to beginner and advanced component scores, overall scores were generated for English literacy, local language literacy and numeracy. These scores comprised all subtasks that were administered to students for the assessment. The only exception was the overall score for English literacy, which omitted the subtask of oral vocabulary. As this subtask was not given in the local language literacy assessment, it was excluded from the overall English score to make the results more comparable. After component scores were created, all scores were scaled from 0-100, for ease of interpretation.

Table 6: Differences in component scores at baseline and endline for CBE and non-CBE

	CBE			Non-CBE		
Component Scores	**Baseline mean percent score (%)**	**Endline mean percent score (%)**	**Change in score (% points)**	**Baseline mean percent score (%)**	**Endline mean percent score (%)**	**Change in score (%points)**
Local language						
Basic local language	19.5	46.2	26.7	14.3	43.0	28.7
Advanced local language	26.2	57.7	31.5	18.4	53.3	34.9*
Overall local language	26.0	55.7	29.6	20.2	51.9	31.7
English						
Basic English	24.6	55.4	30.8	22.6	51.9	29.3
Advanced English	30.4	66.0	35.6*	31.8	64.1	32.2
Overall English	29.7	63.0	33.3*	29.9	60.1	30.2
Numeracy						
Basic Numeracy	46.2	76.4	30.2	45.1	73.3	28.2
Advanced Numeracy	42.6	75.8	33.2*	42.7	72.7	30.0
Overall Numeracy	45.0	76.2	31.2*	44.2	73.1	28.8

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

In respect to local language, though CBE children showed higher mean percent scores for basic, advanced and overall scores at endline, Non-CBE children showed marginally greater progress over the course of the school year in all three instances. Only in advanced local language assessments, however, was this change significant.

For English, whilst baseline component scores were comparable, both endline and progress results for CBE children in basic, advanced and overall scores were higher, with advanced and overall scores showing statistically significant gains.

For numeracy, this same pattern was observed. Whereas baseline results for all three component scores did not differ, CBE children outperformed Non-CBE children in endline results and change scores, with advanced and overall numeracy scores showing statistically significant differences.

3.2.4. Overall Proficiency Levels

Overall component scores were divided into four proficiency categories. These were defined as follows:

1. **Non-performer**, comprising those who scored zero on a component score;
2. **Beginner**, comprising those who scored greater than zero but less than 50;
3. **Approaching proficiency**, comprising those who scored greater than 50 but less than 80; and
4. **Proficient**, comprising those who scored greater than 80.

The overall proportions of CBE and Non-CBE students falling into each proficiency level at baseline and endline are shown in Table 7. This table illustrates large improvements across all categories from the beginning to the end of the first year of public school. This is evidenced by reductions in the two lowest categories and increases in the two upper categories for all overall assessment results for both CBE and non-CBE.

Table 7: Overall scores by proficiency level: CBE versus Non-CBE

Overall scores by proficiency level	CBE		Non-CBE	
	Baseline frequency (%)	Endline frequency (%)	Baseline frequency (%)	Endline frequency (%)
Local Language				
Non-Performer (Zero scores)	16.9	9.0	19.0	10.7
Beginner (>0-50)	61.8	29.3	65.9*	33.1*
Approaching proficiency (50-80)	17.4***	34.0	12.8	31.2
Proficient (>80)	3.8*	27.7	2.3	25.1
English				
Non-Performer (Zero scores)	8.7	3.6	8.3	4.2
Beginner (>0-50)	66.9	25.5	67.0	28.1
Approaching proficiency (50-80)	17.6	33.4	19.3	36.4
Proficient (>80)	6.9	37.5****	5.4	31.3
Numeracy				
Non-Performer (Zero scores)	4.4	2.8	3.2	3.7
Beginner (>0-50)	51.2	9.7	56.4**	12.2*
Approaching proficiency (50-80)	32	33.1	29.1	32.5
Proficient (>80)	12.3	54.4	11.2	51.7

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

In comparing results for CBE and Non-CBE children for local language, whilst over 16% of both CBE and Non-CBE children were identified as non-performers at baseline, this figure was significantly reduced for both groups by the end of the first year of public school with minimal difference observed between CBE and Non-CBE group frequencies (CBE=9%; Non-CBE=10.7%). For the highest proficiency category, very few students were found to achieve over 80% at baseline, however by endline, over a quarter of CBE (27.7%) and Non-CBE students (25.1%) were identified as proficient, with CBE children showing slightly more students in this category relative to non-CBE. Also, a slight higher proportion of CBE students were approaching proficiency during endline (34%) compared to non-CBE students (31.2%).

With respect to non-performers in English, frequencies dropped to about half when endline proficiency results were examined against baseline frequencies with similar proportions observed for both CBE (3.6%) and Non-CBE (4.2%) at this time point. As with local language results, significantly more students were identified as proficient at endline compared with baseline, with significantly greater frequencies of CBE children classified as such, relative to non-CBE. In particular, 37.5% of CBE students were classified as proficient according to the English test during endline whereas 31.3% of non-CBE students were classified as proficient.

Within numeracy, very low frequencies of non-performers were identified at baseline, with even fewer observed at endline for both groups (CBE=2.8%; Non-CBE=3.7%). Moreover, most students (over half) from CBE and Non-CBE were found to be beginners at baseline, whereas by endline, the majority from both groups were found to belong to the highest category of proficient, with CBE again demonstrating an advantage and a significantly higher proportion of students achieving above 80% compared with non-CBE.

3.2.5. Gender Differences

Between group gender differences

Some between and within group gender differences were observed within this analysis. For between group gender differences (See Tables 8 and 9), which compared component scores between girls in CBE and Non-CBE and boys in CBE and non-CBE, females from CBE were found to significantly underperform relative to females in Non-CBE in basic, advanced and overall local language literacy scores at the 1% level. In English, CBE males showed marginally but significantly stronger progress relative to Non-CBE males in basic and overall component scores (5% level). In numeracy, CBE males also showed modestly higher gains than Non-CBE which were found to be significant at the 5% level in advanced and overall component scores.

Table 8: Differences in component scores at baseline and endline for CBE and Non-CBE (Female)

	CBE (Female)			Non-CBE (Female)		
Component Scores	**Baseline mean percent score (%)**	**Endline mean percent score (%)**	**Change in score (% points)**	**Baseline mean percent score (%)**	**Endline mean percent score (%)**	**Change in score (% points)**
Local language						
Basic local language	20.2	44.1	24.0	13.3	42.5	29.2**
Advanced local language	25.6	56.3	30.8	17.5	54.6	37.1**
Overall local language	26.1	54.2	28.1	19.3	52.4	33.2**
English						
Basic English	25.3	54.0	28.7	22.0	51.2	29.2
Advanced English	30.7	66.0	35.3	31.9	64.1	32.1
Overall English	30.3	62.4	32.1	29.7	59.9	30.2
Numeracy						
Basic Numeracy	46.2	75.8	29.6	44.8	73.4	28.6
Advanced Numeracy	43.2	75.1	32.0	42.9	72.7	29.7
Overall Numeracy	45.1	75.6	30.4	44.2	73.1	29.0

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 9: Differences in component scores at baseline and endline for CBE and Non-CBE (Male)

	CBE (Male)			Non-CBE (Male)		
Component Scores	**Baseline mean percent score (%)**	**Endline mean percent score (%)**	**Change in score (% points)**	**Baseline mean percent score (%)**	**Endline mean percent score (%)**	**Change in score (%points)**
Local language						
Basic local language	18.8	48.5	29.7	15.5	43.7	28.2
Advanced local language	26.8	59.2	32.3	19.5	51.8	32.3
Overall local language	25.9	57.3	31.4	21.2	51.3	30.1
English						
Basic English	23.8	57.0	33.2*	23.3	52.6	29.3
Advanced English	30.2	66.1	35.9	31.7	64.1	32.3
Overall English	29.0	63.7	34.7*	30.1	60.3	30.2
Numeracy						
Basic Numeracy	46.3	77.1	30.8	45.3	73.2	27.8
Advanced Numeracy	42.0	76.6	34.6*	42.5	72.7	30.3
Overall Numeracy	44.8	76.9	32.1*	44.3	73.0	28.7

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Within group gender differences

In terms of within group gender differences (See Appendix A) which compared performance between boys and girls in CBE and in non-CBE, significant differences were found with basic component scores for English and local language in CBE, whereby females were found to underperform relative to CBE males (5% level). In advanced and overall scores, however, no significant gender differences were found. Moreover, in all numeracy component scores, insignificant within group gender differences were observed between CBE male and female performance. For Non-CBE students, no significant within group gender differences were observed for any component score assessment.

3.2.6. Summary

Overall, results from this section show that CBE children's learning progress over the course of one academic year was comparable to that of Non-CBE children already within the public education system therefore demonstrating successful transition and adaptation to the demands of public school. This finding is obtained by comparing the progress of CBE children during one year in public schools compared to the progress of a similar group of non-CBE children who were matched according to the grade of the transition, sex and age. It is important to highlight that slightly over 80% of CBE children transitioned into grades 2 to 5 of primary school, and in our case, 22% transitioned in grade 2, 23% into grade 3, 21% into grade 4 and 17% into grade 5, with the rest transitioning into primary grade 6 and above.

In local language literacy, which is determined by the language of instruction of the public school attended by CBE children, though CBE children demonstrated higher performance at the beginning of the public school year, by the end of the year gain scores across subtasks and component scores

showed no pattern of difference. Whilst zero score reductions for Non-CBE students showed greater changes in zero scores overtime, these figures were relative to their percentages at baseline, which were significantly greater in all subtask instances and therefore not demonstrative of greater progress. Proficiency levels for local language literacy showed only modest difference in frequencies between CBE and Non-CBE at endline, however, there was indication of more CBE children being in the highest two categories of proficient and approaching proficient compared with non-CBE. These findings are noteworthy, particularly considering that 43% of CBE children were found to transition into public school environments where the local language of instruction differed from that of CBE (and therefore tested in a different local language). Despite these challenges, however, CBE children were able to show overall learning gains that matched those of Non-CBE children as well as higher proportions of students who were able to achieve above 50% overall in their assessments. It is an indication of the effectiveness of the CBE pedagogic approach in closing the literacy gaps of CBE children and providing them with confidence to apply the skills acquired when they transition into public schools.

In respect to English, CBE's performance matched that of Non-CBE at the start of the public school year. By the end of the academic year, however, differences between raw subtask scores, zero score reductions and component scores revealed slightly stronger progress, a finding modestly significant at the 5% level. This finding is important to emphasise and contextualise with CBE children's educational backgrounds. As CBE is a programme conducted in the child's local language, and because most children would have had very limited access to English instruction due to their out-of-school status prior to enrolling in CBE, the finding that CBE children showed greater progress compared with Non-CBE children in English by the end of their first year of public school in particularly impressive. This finding suggests that the CBE programme was particularly beneficial in equipping its students with the tools to repurpose their local language literacy skills into English language learning contexts.

For numeracy, a similar pattern of results to that of English, was observed. Though baseline differences between CBE and Non-CBE students were not apparent, by the end of one academic year, CBE children revealed greater progress, as evidenced by higher change scores across all subtasks and component scores as well as larger reductions in zero scores. For both CBE and non-CBE, achievement in general, was higher than that of both local language literacy and English, a result confirmed through the analysis of proficiency scores which revealed 54.4% of CBE and 51.7% of Non-CBE identified as achieving overall results that were greater than 80%.

3.3. Examining Progress in CBE and Non-CBE Groups: A Difference-in-Difference Approach

In order to determine the impact of CBE on children's learning outcomes in public school over time, a difference-in-difference (DID) estimation approach was applied. Difference-in-difference is a useful method to apply when randomisation on the individual level is not possible to achieve. The approach allows for biases to be removed in the post-intervention phase between the CBE and Non-CBE group, that could arise from permanent differences between groups, as well as biases from comparisons over time. DID is applied as an interaction term between time and treatment group (CBE) variables in a regression model (Cerulli, 2015). Our current analysis estimated the impact of CBE on children's progress from the beginning of the public school year to the end of the year, in overall English, local language literacy and numeracy scores using three linear regression modelling stages.

The first stage estimated changes in assessment scores over the period of one academic year in public school for the raw sample of CBE and Non-CBE children. The second involved estimated changes for the raw sample with controls including age, grade, language, access to mother tongue language instruction at public school and relative wealth status. The third estimated changes in test scores for a matched sample of CBE and Non-CBE students. This stage was particularly important as it ensured the robustness of our statistical analysis and conclusions.

This matched sample was determined in the Cycle 4 Tracker Baseline Study through a process known as Propensity Score Matching (Rosenbaum and Rubin 1983; Heckman, Ichimura and Todd 1997). This firstly involved estimating a binary logit model which specified the probability that a child belonged to the CBE group as a function of the observable factors obtained from the survey. The explanatory variables used in this analysis were the same as those applied in the CBE Tracker Baseline Study and included, for instance, overall baseline assessment scores, age, grade, gender language and relative wealth position.

Following this stage, the binary logit model was checked to test the equality of the mean and standard deviations of the explanatory variables across CBE and Non-CBE sample. This test is called the

balancing propensity test (Rosenbaum and Rubin 1983; Heckman et al. 1997; Dehejia and Wahba, 2002). Using a nearest neighbour approach with a 1 to 1 match, each CBE child was matched with a Non-CBE child on observed characteristics included in the model. This allowed for a more comparable matched sample of 731 CBE and 731 Non-CBE children to be extracted and a more precise estimation of CBE's impact over time to be obtained.

3.3.1. Linear Regression Modelling Estimating CBE's Impact on Learning Progress

Table 10 shows the results of nine models (M1-9). Models 1-3 represent regressions for the Overall Local Language gain scores, first looking at the raw estimate of CBE's impact at the end of the first year of public school (indicated by the interaction term 'Time#CBE'), whilst accounting for baseline differences in scores (indicated by 'CBE') as well as the average time trend (indicated by 'Time'). Model 2 adds a number of controls drawn from Child Survey data which include, for example, age, grade, gender, language and relative wealth status[6] to this estimation. In addition, responses from Child Survey binary (yes/no) questions relating to access to literacy materials at home (e.g. books or other reading materials) and engagement in literacy (e.g. reading or writing) and numeracy (e.g. counting tasks) activity at home were incorporated as explanatory variables. Finally, Model 3 estimates changes in test scores for the matched sample of CBE and Non-CBE students. Models 4-9 follow the exact same approach as Models 1-3 but include Overall English and Numeracy gain scores as outcome variables.

Table 10: Linear regression models estimating CBE' impact on learning progress

	Overall Local Language			Overall English			Overall Numeracy		
Variables	**M1 Raw**	**M2 Controls**	**M3 Matched**	**M4 Raw**	**M5 Controls**	**M6 Matched**	**M7 Raw**	**M8 Controls**	**M9 Matched**
Time	31.74***	32.28***	30.84***	30.21***	31.87***	31.90***	28.84***	30.70***	30.35***
CBE	5.84***	6.35***	-1.49	-0.19	0.75	-1.01	0.72	1.82	-0.72
Time#CBE	-2.09	-2.12	2.4	3.13	3.04*	2.7	2.41	2	3.34
Age		-0.15			0.28			-0.1	
Grade									
Grade 2 (Reference group)									
Grade 3		4.90***			5.34***			7.31***	
Grade 4		13.37***			13.55***			16.06***	
Grade 5		15.90***			20.05***			20.57***	
Grade 6		20.96***			26.61***			24.02***	
Female		-1.64*			-0.62			-1.21	
Language Asante-Twi (Reference group)									
Dagaare		-12.53***			-9.70***			-2.07*	
Dagbani		-21.11***			-14.21***			-18.89***	
Ewe		-7.78**			6.80*			-1.79	
Gonja		-15.37***			-15.49***			-8.18***	
Kasem		-46.42***			-4.71**			0.17	
Literacy materials at home		-3.17**			5.19***			5.44***	
Access to mother tongue		6.89***			-1.74*			3.48***	
Non-attendance		0.00			0.25			-1.00***	
Household size		0.38***			0.11			0.17*	
Literacy activity at home		12.54***			13.56***			7.10***	
Numeracy activity at home		-0.91			-0.88			-0.47	
Work outside home		-10.37***			-4.90***			-2.17**	
Wealth index									
Low (Reference group)									
Mid-Low		0.05			0.73			-0.16	
Mid-High		0.39			-0.56			-0.83	
High		0.32			0.08			-0.73	
Constant	20.16***	21.97***	22.27***	29.86***	12.79***	29.96***	44.23***	31.79***	44.72***

[6] Responses to the household economic questions were used to create a wealth index as a proxy for socio-economic status. This was created through using tetrachoric correlations for all binary variables and then split into quartiles by district. These quartiles are Low, Mid-Low, Mid-High, and High. These were then used to help differentiate among students who were relatively richer and relatively poorer than others in the sample.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

3.3.2. The Impact of CBE on Progress in Local Language Literacy

As seen in Model 1, the raw estimate of CBE's impact on children's local language progress by the end of the first year of public school was not found to be significantly different from Non-CBE children's progress after conditioning out baseline differences in CBE children's scores (which were significantly higher than Non-CBE at this time point by 5.84 percentage points) as well as the average trend in progress over time (which was also significant and estimated as 31.74 percentage points).

This same pattern of results was observed in Model 2 which incorporated a range of confounding variables. Model 2 revealed, however, that grade level at public school was strongly predictive of gain scores; where Grade 2 represented the reference category, Grades 3, 4 5 and 6 revealed respectively higher scores which were statistically significant in each case. Female students were further found to significantly underperform relative to males by -1.64 percentage points.

For language, considerable variation was observed for local language Literacy gain scores. Asante-Twi showed the strongest gains, as indicated by all other languages showing statistically lower scores. Ewe also demonstrated relatively strong progress whereas Dagbani and Kasem achieved the lowest gain scores relative to Asante-Twi by -21.11 and -46.42 percentage points respectively. Additional factors which positively predicted gain scores included access to mother tongue instruction (6.89 percentage points) and engagement with literacy activity at home (12.54 percentage points). Interestingly, for local language gains, having literacy material at home negatively predicted progress by -3.17 percentage points, as did working outside of home, by -10.37 percentage points.

Following regression modelling using the matched CBE and Non-CBE sample, further robust evidence was provided that CBE children's progress in local language after one year of public schooling was not significantly different to children already in the public system after accounting for systematic differences between groups. This, therefore, demonstrated comparable performance over time.

3.3.3. The Impact of CBE on Progress in English

In establishing the raw estimate of CBE on gain scores in English at the end of first year in public school (see Model 4) though overall progress over time was significant (30.21 percentage points), no significant differences between CBE and Non-CBE were observed (as indicated by the interaction term Time#CBE). In Model 5, however, CBE children's progress relative to Non-CBE was found to be significantly higher at the 5% level by 3.04 percentage points, after controlling for a number of confounding variables.

As with findings related to local language literacy, Grade level was found to be a significant predictor of student progress. In respect to language differences, Ewe achieved the greatest progress over time, as indicated by a 6.8 percentage point gain compared to the reference group of Asante-Twi. Dagbani and Gonja showed the lowest gains relative to Asante-Twi by -14.21 and -15.49 percentage points. Having access to literacy materials at home as well as engaging in literacy activity predicted progress in English. A significant negative association was observed with having access to mother tongue instruction in public school, a result which is unsurprising considering that students may have less opportunity as well as motivation to practice their English skills if they are able to use their home language. This may also be linked to student's grade level, a variable that will be explored in more depth later in the chapter.

Whilst CBE children's progress was found to be modestly significant in this model, analysis involving the matched sample of CBE and Non-CBE children (see Model 6) demonstrated no significant difference. The key advantage of the matched sample is the ability to condition out for background socio-demographic and -economic characteristics of CBE and non-CBE learners and therefore conditioning out the potential bias which may be induced by these factors when making the comparison between CBE and non-CBE children. Clearly, CBE children were selected into the CBE programme in the first instance as these children have not had any opportunities to learn in formal schools or have already dropped out and therefore the CBE programme is a second opportunity. In contrast, non-CBE children, although attending the same public school and in the same grade, have not yet dropped out from school. Therefore, factors such as poverty, family background and livelihoods may differ between these groups and may explain also differences in schooling and learning outcomes. As noted, this approach provides the most robust estimate of CBE's impact of children's progress over time which can be concluded as comparable in English following matched sample comparisons.

3.3.4. The Impact of CBE on Progress in Numeracy

Model 7, which demonstrates raw sample comparisons, also indicates insignificant difference between CBE and Non-CBE progress by the end of the first year of public school in numeracy. This model similarly highlights the comparability in CBE and non-CBE's children's numeracy performance at baseline as well as strong progress of approximately 30 percentage points for both groups over the course of the academic year.

These findings were corroborated in Model 8 with the incorporation of additional controls. This model further showed that grade level strongly predicated progress, along with both having and using literacy materials at home. Access to mother tongue language in the public school environment was also positively associated with progress. For language, Kasem, Asante-Twi and Ewe showed the strongest rates of progress with no significant differences observed between these languages. Dagbani, on the other hand, showed the lowest progress overtime relative to the reference category of Asante-Twi. Household size was also found to show a positive association with numeracy progress, where children living in larger households achieved greater progress in mathematics (significant at the 5% level).

Non-attendance at school was a variable which negatively predicted gain scores; when children were asked how many days of public school had been missed in the last week, each day was associated with a decreased score of 2.17 percentage points. Working outside of home was associated with significant decreases in progress for numeracy however, the estimated coefficient for this variable (-2.17) was much lower than that found for English (-4.90) and for local language (-10.37). This finding suggests that the impact of work outside of home may not be as detrimental for progress in numeracy, compared with that of literacy.

In the final regression model which involved the matched sample of CBE and Non-CBE children (See Model 9), the finding that CBE's gain scores in numeracy were comparable to those children already in public school after one academic year, was supported. This was evidenced by an insignificant interaction term 'Time#CBE'.

3.3.5. Linear Regression Modelling estimating between Group Gender Effects

As noted in Part 1, some significant between group gender differences were observed with comparisons of raw overall scores. As noted, females from CBE were found to significantly underperform relative to females in Non-CBE in overall local language literacy scores (1% level). In English and numeracy, CBE males showed significantly stronger progress relative to Non-CBE males in overall component scores. In order to investigate these findings further we undertook regression modelling restricted to subgroups of only male (CBE and non-CBE) and female (CBE and non-CBE) students, for which overall assessment scores were the outcome variables. This analysis applied the same difference-in-difference approach. Predictor variables for models applying controls matched those from previous examples which investigated overall sample differences (E.g. Models 2, 5 and 8 from Table 10).

In examining male subgroup differences (See Appendix C), it was found that whilst CBE boys achieved gain scores which were on average higher than Non-CBE boys in both English and Numeracy, across all model examples including those examining raw estimates, estimates with controls and matched estimates, none of these findings were found to be significant. In female subgroup analysis, however, CBE female's significant underperformance relative to Non-CBE females in local language literacy was maintained in Model 1 which estimated raw sample differences without controls (-5.11 percentage points), but not in Model 2 which incorporated controls, nor in Model 3 which examined matched sample differences. Based upon this subsample analysis, it can be concluded that after controlling for number of confounding variables and addressing systematic sample differences through matching, male and female progress was mostly comparable over time across all three areas of learning.

3.3.6. Linear Regression Modelling Estimating Grade Level Effects

Regression models examined in this chapter have thus far indicated similar progress for CBE and Non-CBE children in public school. We wanted to know, however, if this finding would be maintained if students' scores in Grades 3 and below (i.e. where students learn in their local language alone) were examined separately from students in Grades 4 and above (where students learn English alongside their local language). We therefore looked at subgroup models for this analysis in order to better determine the respective influence of CBE and grade of placement in school on differences in local language, English language and numeracy scores.

Appendix D demonstrates the results of these models. In firstly examining findings focused on students in Grades 3 and below, it can be seen that whilst no pattern of difference was observed for CBE's

impact on students' progress for local language and English model, CBE children were found to significantly outperform Non-CBE children in numeracy across all three estimation examples. In fact, CBE students' advantage was found to be highest (by 7.07 percentage points) within matched sample estimates, which provides robust evidence of their particularly strong progress relative to Non-CBE in lower grade levels.

In examining models focused on children in Grade 4 and above however, no significant differences were found between CBE and Non-CBE children's gain scores across all model examples. In respect to gender however, girls in higher grades were found to underperform in local language as well English by approximately two-percentage points, a finding that was modestly significant (5% level).

3.3.7. Summary

Using a difference-in-difference approach to analysis, the results presented in this section have supported a number of key findings from Section 3.1 of the report.

1. There was comparable progress of the overall samples of CBE and Non-CBE children in overall local language after one year of public school, as evidenced by insignificant differences across all stages of regression modelling investigating CBE's impact on learning.

2. This analysis has also revealed CBE's and Non-CBE children's similar improvement in English. Though there was suggestion of CBE's greater progress in this learning area by the end of first year in public school when examining raw sample differences with controls, with matched sample analysis, no significant difference was detected between CBE and Non-CBE children's learning gains. As noted, this technique provided the most robust estimate of CBE's impact and therefore reinforced the comparability of CBE and Non-CBE students' improvement in English.

3. With respect to numeracy, specifically, gain scores were found to be statistically higher for CBE children in Grades 3 and below compared with Non-CBE children in these same grades. In examining overall sample differences, however, as well as subsample differences for CBE and Non-CBE children in Grade 4 and above, no statistically significant differences were observed. These results show that whilst CBE children show a particular advantage in numeracy when placed in lower grades, they demonstrate an equal degree of progress relative to their public school peers when placed in higher grades.

4. Regarding gender differences, results from Part 1 indicated that CBE girls showed less progress relative to Non-CBE girls in local language. In estimating differences in results through regression modelling which controlled for a number of variables, however, this finding was not maintained, a result confirmed through matched sample estimations. Grade level subsample analysis, however, did indicate that female's performance (both CBE and Non-CBE) relative to males was significantly lower by about two percentage points for students who were in Grades 4 and above, both in local language literacy and English. Whilst this result revealed only a small discrepancy between gains which were modestly significant at the 5% level, it does suggest that interactions between grade level and gender may exist which could result in differing outcomes for students. It may also indicate differences in grade placement between boys and girls.

5. Across models and assessments, key predictors of learning gains included grade and engagement in home literacy activity. Having literacy materials at home was also positively associated with progress in English as well as numeracy. Access to mother language in the school of instruction further strongly predicted gains in local language and to a lesser extent, numeracy. Variation between languages was apparent across models. Asante-Twi, for example, showed the strongest progress within local language overall. In English, however, Ewe revealed the highest gains relative to other languages. In numeracy, Kasem, Asante-Twi and Ewe were found to have comparably high gain scores. In terms of the lowest gain scores there was also considerable difference observed. In local language, for example, Kasem demonstrated the weakest progress. In English, however, it was Gonja, whereas in numeracy, the lowest gains were found with Dagbani. A key variable which revealed a negative association with student progress, as demonstrated across models and assessments, was working outside of home. In other words, those children that were required to study and also work outside of the family context, were negatively impacted in their progress across learning areas.

3.4. Conclusion

Section 3 of the report has highlighted CBE children's successful transition into public school following completion of the CBE programme. This was evidenced by comparable progress with children already in the public school system across learning areas over the course of one academic year. Findings also suggested that CBE children demonstrate a particularly good capacity to adapt to English language instruction and apply their language skills, as learnt in CBE, in new educational environments. It has further revealed CBE student's strengths in numeracy, as shown by their equal progress in higher grades of learning and stronger progress in lower grades.

Challenges have also been highlighted for CBE children's transition into the public school system. Among these are transitions into learning environments where the local language of instruction does not match CBE and potentially some gender differences in placement. As shown in the analysis, not having access to local language was linked to lower progress not only in local language assessments, but also in numeracy. Having to work outside of home alongside study was also found to be a significant challenge for learners, impacting progress in all learning areas. Girls in higher grades performed lower than boys indicating potentially a placement misalignment.

In conclusion, findings from this analysis demonstrate the effectiveness of CBE in preparing students academically, for public schools. The fact that CBE students show comparable, and in certain instances stronger progress than children already in public schools, particularly considering their past educational experience either as a dropout or never enrolled, stands as testament to the quality of CBE instruction and its positive influence on future learning. The next section illuminates these findings by drawing on qualitative as well as quantitative data which highlights the learning experiences and wider relationships with teachers and peers of CBE graduates when they transitioned into public school.

4. Learning Gains and Experiences of Transitioning CBE Graduates

4.1 Using a Mixed-Method Approach

This section brings together the findings of the mixed qualitative and quantitative strand of the research into the experiences of CBE graduates as they transition into public schools. Mixed method approaches are frequently chosen to develop robust explanations through combining the particular strengths and informational yields of diverse data sources. Aiming to understand the learning achievements and levels of cognitive progress of CBE graduates as well as their subjective experiences and perceptions of transition as well as those of their families and communities, provided an in-depth understanding of the impact of the CBE programme.

Quantitative data, which assesses the achievements and learning outcomes in English, numeracy and local language literacy during CBE and their transition, is complemented by qualitative data of interviews, classroom observations, role-play and focus group discussions illuminating how CBE graduates experienced their learning and socialisation in public schools during their first year of transition. Data gathering also engaged with their families and the wider communities. How CBE graduates and their families and wider communities experience, perceive and feel about their transition revealed by qualitative insights helps to understand and interpret the level of cognitive progress and learning gains indicated by the quantitative data. Finally, we integrate the findings from both strands to provide a holistic and situated understanding of the transition of CBE graduates and in particular the impact of CBE on graduates in preparing them to be resilient in public schools. In so doing it builds on and diversifies the broad findings on the positive achievements of CBE graduates by comparison with Non-CBE graduates of the quantitative data in Section 3.

The table below summarises the two complementary strands of the CBE mixed methods research:

Table 11: Mixed methods, questions and data sources

Method	Key questions and issues	Data sources	Knowledge gains
Qualitative Strand	How do CBE graduates (HPB, LPB, HPG, LPG) and their families experience their transition from CBE into public schools?	In depth interviews Drama and role play Lesson observations of CBE graduates	Detailed data on the experiences, perceptions, emotions, beliefs of CBE graduates and their families
Quantitative Strand	What are learning gains/extent of progress of pupils during CBE and during transition into public school? Attitudes to transition experiences of CBE graduates	Learner assessments in local language literacy, Numeracy during CBE and in local language literacy, English and Maths in public school Attitudinal Surveys	Data showing changes in learning across four-time frames (the start of CBE, end of CBE, and beginning and end of public school) disaggregated by high and low performing subgroups, gender and access to mother tongue instruction.

4.2 Understanding Learner Experiences

The research into the transition trajectories of CBE graduates combined qualitative and quantitative findings through the concept of **learner experiences.** This, frames learning as a situated social practice that involves not only cognitive dimensions or the acquisition of knowledge but also embodied, emotional, social and relational and cultural aspects rooted in particular contexts (Tobel et. al. 2010).

Hence the insights of quantitative data on progress in cognitive domains may be related to other insights from qualitative data that provide in-depth insights into the subjective experiences of learning in their CBE and public schools. Thus, cognitive achievements may be illuminated by pupils' experiences of and perceptions of their engagement with learning processes in public schools, their relationships with teachers and pupils and their navigation of out of school factors. These all shape learner's identities - who they think they are and who they want to be as a result of their learning. Hence, learning outcomes as tracked by quantitative data may be seen as effects of many subjective and contextual factors which can be revealed by qualitative research.

4.3 Recognising Distinctive Trajectories: CBE Graduates and Students in Public Schools

It is important to recognise that CBE graduates are not a homogenous group, hence the need to disaggregate findings in relation to the learning progress and experiences of High Performing Boys (HPB), High Performing Girls (HPG), Low Performing Boys (LPB) and Low Performing Girls (LPG). Splitting the groups by achievement level was based on the need understand the rate of progress students at different ability levels made as a result of the programme. The identification of low and high performers for qualitative analysis was made on the basis of CBE facilitator's judgements and in part on their prior performance in assessments in English, Mathematics and their local language during CBE.

While much of what is said about the learning achievements and experiences of HPGs, LPGs, HPBs and LPBs could be said of other Non-CBE graduates at the same level, this particular constituency have arrived at these levels through a distinctive educational trajectory. This includes their prior experience of CBE and a shift from being out of school to being in public school, one which they have navigated, and which has affected and been affected by their families and communities.

Their responses to public schools and their progress should therefore be understood as effects of their prior experiences which impacts their experience of the transition. In other words, the learning outcomes achieved by CBE graduates, as well as their subjective navigation of their public school environments may be understood as conditioned by their prior learning and experiences. Thus, unlike their counterparts, the CBE experience of these graduates was not something which happened in the past but was as a result of their interactions with the public school environment, its curricula, instructional routines and socialisation challenges. While therefore some of the characterisations of the experiences of different groups of learners may seem to be generic, in fact they are constituted for CBE graduates by a particular history of learning experiences and environments and a distinct educational journey.

4.4 Understanding the Transition Experience of CBE Graduates

By drawing together the findings of the quantitative and qualitative research around four key themes we were able to illuminate diverse dimensions of the transition experience of CBE graduates into public schools. These include:

1. CBE graduates learning outcomes as measured by assessments (quantitative) and their experiences and feelings towards pedagogical processes and their public school classroom experience (qualitative).
2. CBE graduates' attitudes to learning and their engagement with the learning environments of CBE and public school, drawing on qualitative data based on interviews, dramas with CBE graduates and quantitative data based on surveys.
3. The family and community contexts of CBE graduates transition drawing on interviews with families and communities (qualitative) as well as surveys to households and assessments of poverty levels (quantitative).
4. Management of transition and school allocations by CBE Administration and Public Schools

The table below summarises the dimensions of transition and sources of data used to illuminate them:

Table 12: Dimensions of Transition, key issues and data sources

Dimensions of transition	Key issues (qualitative and quantitative)	Data sources (qualitative and quantitative)
1. CBE graduates learning outcomes and their experiences of learning by gender	• Learning outcomes in local language literacy, numeracy, and English language literacy? • How CBE female and male graduates repurpose prior learning?	• Learning assessments • In depth interviews with CBE graduates based on observations of their classroom responses • Observations of CBE graduates at the start, middle and end of lessons

2. CBE graduates' attitudes to learning and their engagement with the learning environments of CBE and public school by gender	• How CBE female and male graduates experience and understand their transition from CBE to public school? • How they experience the instructional routines, relationships of public school? • How they navigate instructional practices of public school and extent to which they repurpose prior knowledges and skills learned during CBE?	• Questionnaires for CBE graduates • In depth interviews with CBE graduates about their feelings towards learning, sense of making progress, overall confidence and socialisation in public schools • Child friendly strategies including drama and role play
3. CBE graduates and the family/ community context impacting on their transition.	• How CBE female and male graduates navigate their changing relationships with family and community during their transition? How community attitudes to education change as a result of the CBE graduate experiences	• Interviews with teachers, families of CBE graduates and community members • Surveys of CBE graduates and learner assessments
4. Management of transition	• What challenges undermine the successful transition of CBE female and male graduates? • What good practices currently in place can be built upon?	• Interviews with Headteachers and teachers • Data on allocation of CBE graduates to schools

4.5 Intersection of Learning Achievements and Experiences of CBE Graduates during Transition

This section relates assessment data on learning achievements[7] and outcomes of HPB, LPB, HPG, LPG to the qualitative evidence, based on lesson observations and of CBE graduates' attitudes to and participation in learning activities and tasks, their interaction with teachers and other pupils. The quantitative data highlights the learning outcomes of high and low performing boys and girl CBE graduates in local languages, English and Numeracy. From this, we are able to draw conclusions about the progress made by these different groups during CBE and then in their experience of public school. Insights from the qualitative data are then used to interpret, illuminate and give meaning to these findings. These are based on interviews, focus group discussions, and role plays with 48 CBE graduates in 12 public schools (HPG, LPG, HPB, LPB) situated in diverse regions of northern Ghana.

Low performing and high performing students represent different groups of students. The quantitative sample, for instance, was chosen from the entire CBE sample at; the start of CBE, end of CBE and beginning of public school and end of the first year of public school. In order to maximize the sample size represented in the quantitative analysis presented, students were drawn from a number of contexts including different regions, districts, languages and CBE centres. Because the qualitative data phase necessitated a purposive sampling approach, this same representation could not be captured. This explains why the students selected for the qualitative and quantitative analysis differed. Because of this, it must be noted that differences between student groups, not related to the variables in question, may influence results.

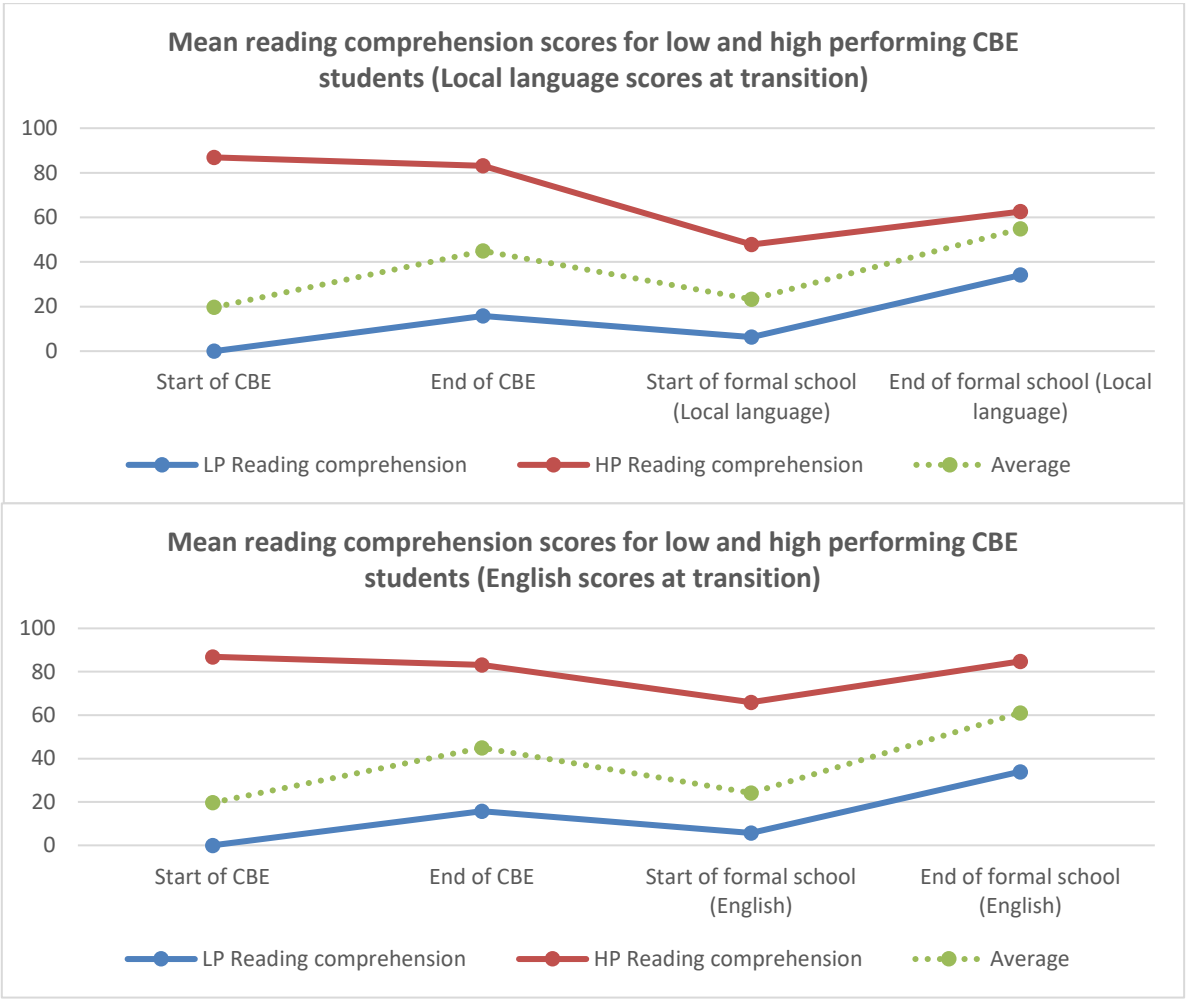
4.5.1 Lower and Higher Achievers Learning Performance and Gender

In comparing CBE and Non-CBE students' assessment results, it must be remembered that the majority of CBE students had only been exposed to English language instruction for a minimal period as the CBE programme is conducted in the local language. They also had less experience in a public school environment with 77% of the sample having never attended school prior to CBE. Moreover, for local language assessments, 43% of CBE students were tested in a language that differed from that used in CBE. The comparable and, at times, superior performance of CBE students, therefore, needs to be contextualised and appreciated, with these challenges in mind.

[7] We defined low performance was defined as those students who were identified as non-performers at the start of CBE. That is, students who received zero scores and were unable to answer a single question on any of the subtask assessments for local language literacy or numeracy. For the subsample representing low performers in literacy, 135 students (Male =72; Female=63), for which data was available at the start of CBE, end of CBE and beginning of public school and end of the first year of public school, were identified. For low performance in numeracy, 69 students (34 male; 35=female) were identified. High performance was defined as those students who had achieved 70% or greater in the overall literacy and numeracy assessment which encompassed all subtasks, at the start of CBE. For literacy, 105 students (Male =50; Female=55) for which data was collected at each of the aforementioned time points, were identified. For high performance in numeracy, 209 students (112=Male; 97=Female) were identified).

In examining low performing and high performing students' academic performance from the start of CBE to the beginning of public school in literacy, results for the subtask of reading comprehension were compared.[8] Figure 1 shows the average result for all CBE students and also the mean results for students defined as either low or high performing at the start of CBE, end of CBE, and/or beginning of public school and end of the first year of public school for reading comprehension in local language. Because students were also tested in English, as well as their local language when they were tracked into public school, Figure 1 also compares performance for this language. As can be seen, across all time points there were strong differences between low and high performing students with the latter group outperforming the former in all cases.

Figure 1: English and Local Language Literacy



Performance in Local Language

At the start of CBE, because low performers were identified as non-performers, the mean scores shown in Figure 1 are 0. For high performing students, who were identified as those achieving equal to or greater than 70 percentage points at the start of CBE, the mean score in local language reading comprehension was 86.9 percentage points. At the end of CBE, whilst low performers demonstrated some progress, as evidenced by an increased mean percent score of 15.79, their performance relative the overall group of CBE students, remained low. High performing students showed only slightly lower mean percent scores (83.16) at the end of CBE compared to the start of the programme.

At the beginning of public school, following several months break from the CBE programme, low performing students showed a reduction in mean scores to 6.37 for local language reading comprehension (See Figure 1). By the end of the first year of public school, though low performing

[8] Due to differences in content and format between the EGRA/EGMA instruments used for the Cycle 4 Tracker study and the previously adopted CBE assessments used at the beginning and end of CBE Cycle 4, only several subtasks were able to be directly compared. This included letter sound identification and reading comprehensions for literacy and missing number and two digit/addition subtasks for numeracy.

students made sound progress in reading comprehension, as evidenced by an increased mean percent score of 34.1 in the local language subtask, relative to the average level of performance of CBE graduates, low performing students significantly underachieved.

High performing students similarly experienced knowledge loss in local language literacy at the start of public school, as shown by a reduced mean percent score of 47.81. In interpreting this figure, however, it needs to be remembered that the sample in question includes high performing students who transitioned into a non-mother tongue local language instructional environment, whereby the assessment would have presented obvious difficulty, irrespective of their demonstrated ability in CBE. In addition, because many high performing students entered public school in Grade 5 and above, whereby the dominant language of instruction is English, their opportunities for developing their local language skills were more limited, compared with students who entered into Grades 3 and below.

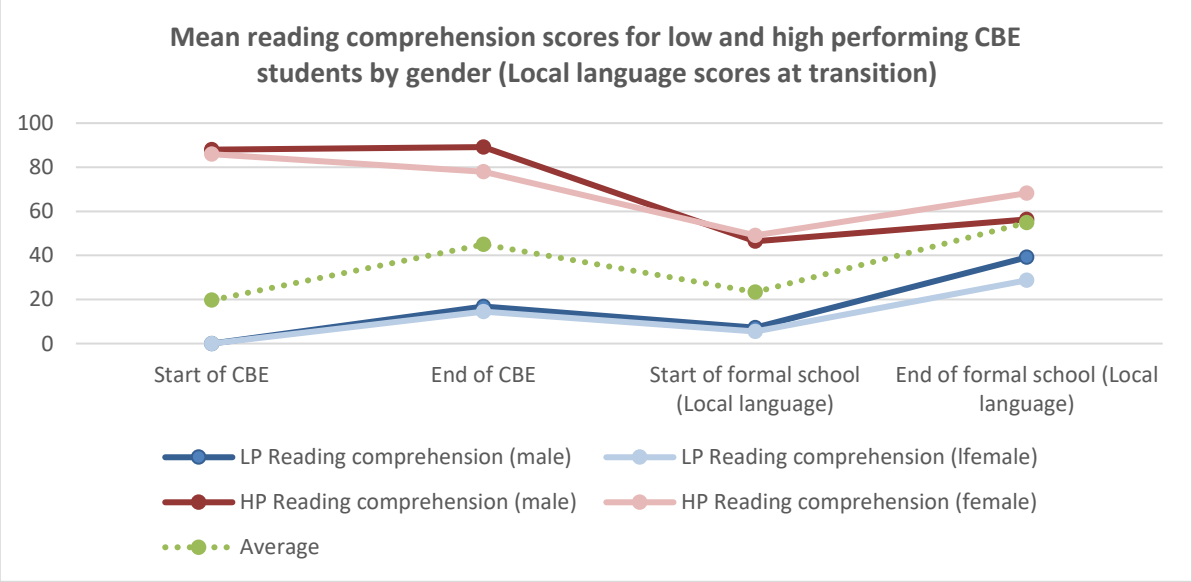
Performance in English

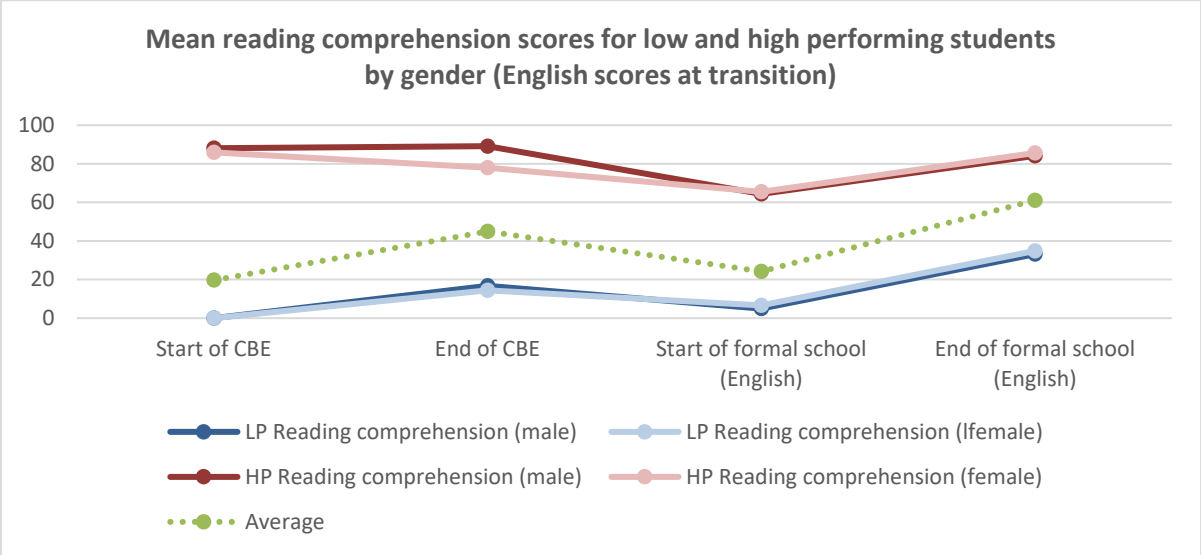
Low performing students were also found to demonstrate difficulty with English reading comprehension when they entered public school, as evidenced by a mean score of 5.78 (See Figure #). Whilst progress was achieved by the end of the first year of public school for this subgroup as demonstrated by an increased mean score of 33.9, relative to the average level of achievement in English at this time point, performance was significantly lower. For English, high performing students achieved an average of 65.95 percentage points at the start of public school. By the end of the first year of public school, this average increased to 84.9 percentage points. In all cases, high performing students showed mean percent scores that far exceeded the average level of performance across time frames.

Performance by Gender: English and Local Language

Figure 2 below shows the results for low and high performing students in reading comprehension at the start of CBE, end of CBE, start of public school and end of the first year of public school, disaggregated by gender. For low performing students, minimal difference was observed between male and female students across time frames for mean results in reading comprehension in English. In local language, whilst this was also the case for students up until the point of transition, by the end of the first year of public school, low performing girls were found to achieve over 10 percentage points lower on average, compared with low performing boys.

Figure 2: Performance in Reading Comprehension



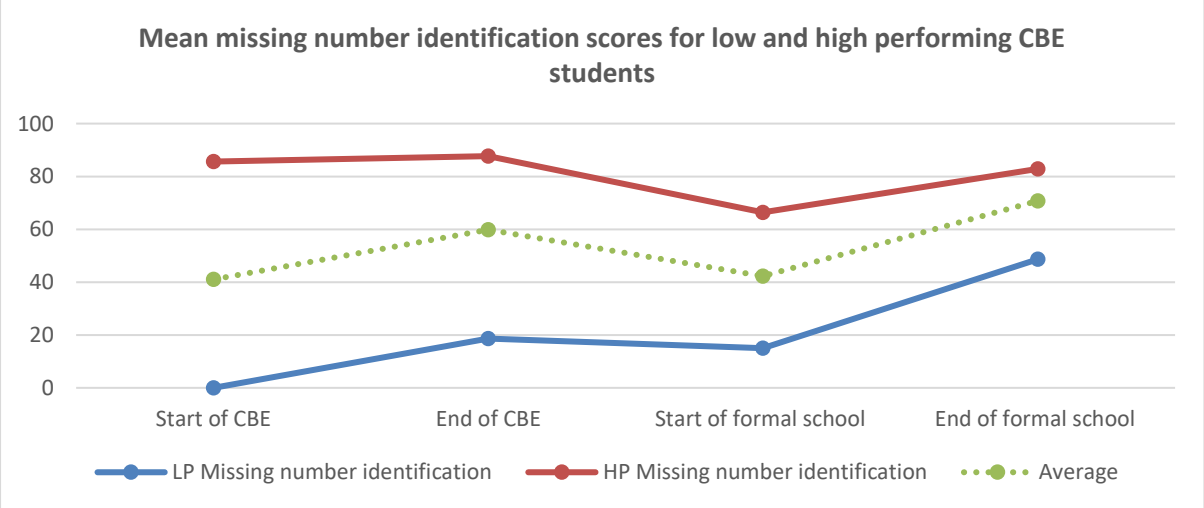


For high performing students, whilst at the start of CBE differences were marginal in local language reading comprehension, at the end of CBE, females performed on average, 12 percentage points lower than males. At the start of public school mean percent scores between males and females for both local language and English reading comprehension were comparable. By the end of the first year of public school, though this remained the case in English, suggesting that high performing females experienced an equally successful academic transition in this subject relative to males, for local language reading comprehension females were found to outperform males by close to 12 percentage points.

Performance in Numeracy

For numeracy, results for low and high performing students in missing number identification were compared at the start of CBE, end of CBE, beginning of public school and the end of the first year of public school (See Figure 3 below). Across all time frames, high performing students continued to significantly outperform low performers as well as remain above the average level of performance. For low performers, progress was observed from the beginning to end of CBE with mean results increasing to 18.64%. When low performing students entered public school, only a slight drop in performance was found demonstrating that this group of students were able to retain most of the knowledge they were able to gain from CBE which related to this sub task. By the end of the first year of public school, low performing students demonstrated sound progress as indicated by an increased mean percent score of 48.6. Across time periods, however, low performing students were found to remain well below the average level of performance for the missing number identification subtask.

Figure 3: Numeracy performance – missing number identification



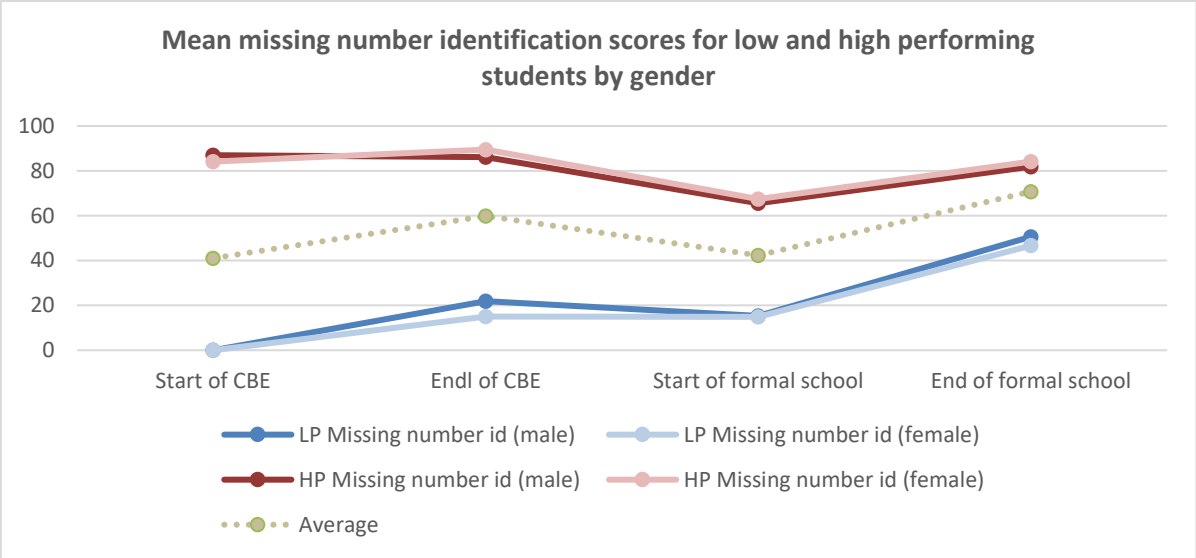
For high performing students, results were again comparable from the start to the end of CBE. At the start of public school, however, high performing students' scores dropped noticeably, suggesting challenges with retaining information related to this specific subtask during the transition break. By the

end of the first year of public school, the average mean percent score showed improvement by 16.5 percentage points, however, high performing students' scores at the time point were slightly lower than those found during CBE for this subtask. In examining this result, however, it needs to be remembered that the current analysis reflects achievement in only one subtask of numeracy that could be compared across the four-time frames in question. As noted, CBE students showed higher performance in numeracy, compared with literacy, when component and overall results were considered both during the CBE programme and at the start and end of the first year of public school. In addition, overall numeracy scores at the end of CBE were found to be significantly higher for CBE students than overall numeracy scores at the end of CBE as well as beginning of public school.

Performance by Gender: Numeracy

Figure 4 below shows low and high performing students results for missing number identification, disaggregated by gender. Whilst low performing girls were found to perform approximately 7 percentage points lower than males at the end of CBE, this gap was reduced when observing results at the beginning and end of the first year of public school. For high performing males and females, only marginal differences were observed across time points.

Figure 4: Missing number identification performance by gender

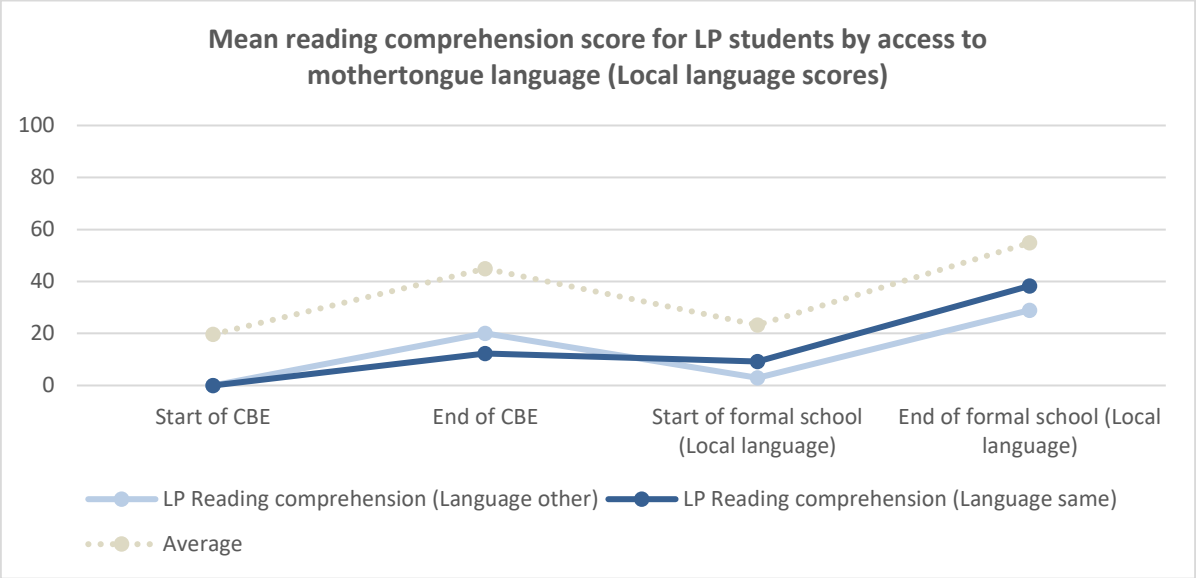


4.5.2 Learning Performance and the Impact of Mother Tongue Language in Transition School

As highlighted in the CBE Cycle 4 Tracker Report (2018), 43% of the overall CBE sample was found to transition into a language that differed from their mother tongue language. This report revealed significant differences between students who had access to their home languages, particularly for local language literacy and to a lesser extent, numeracy, and therefore we were interested in determining to what extent this variable impacted low and high performing students.

Figure 5 compares low performing students' scores on reading comprehension in local language, disaggregated by access to mother tongue language. 'Language other' signifies those students who transitioned into a non-mother tongue language at the start of public school, whereas 'Language same' indicates students who transitioned into the same language. Whilst this variable is of the greatest interest during student's transition in public school, due to the CBE programme being conducted in students' mother tongue, Figure 5 shows the disaggregation at the end of CBE as well as start and end of public school, in order to ascertain if differences existed prior to this time period, which could suggest the influence of other confounding variables on results.

Figure 5: Reading score of low performers by access to mother tongue language



High performing students' scores have been omitted from the graph since most transitioned into higher grades where English replaced local language as the main language of instruction. For this subgroup and especially those who were in schools where the local language was different from that of CBE, experience in the local language of the assessment was extremely limited. Due to this, the enumerators indicated that a number of students did not attempt the local language assessments which makes fair comparisons for high performing students on this variable impossible.[9] This point, however, does highlight that high performing students who are able to move into Grades 4 and above where English replaces local language as the main language of instruction may be impeded from further developing their local language (whether the same or different to that of the school) skills relative to students placed in lower grades following CBE.

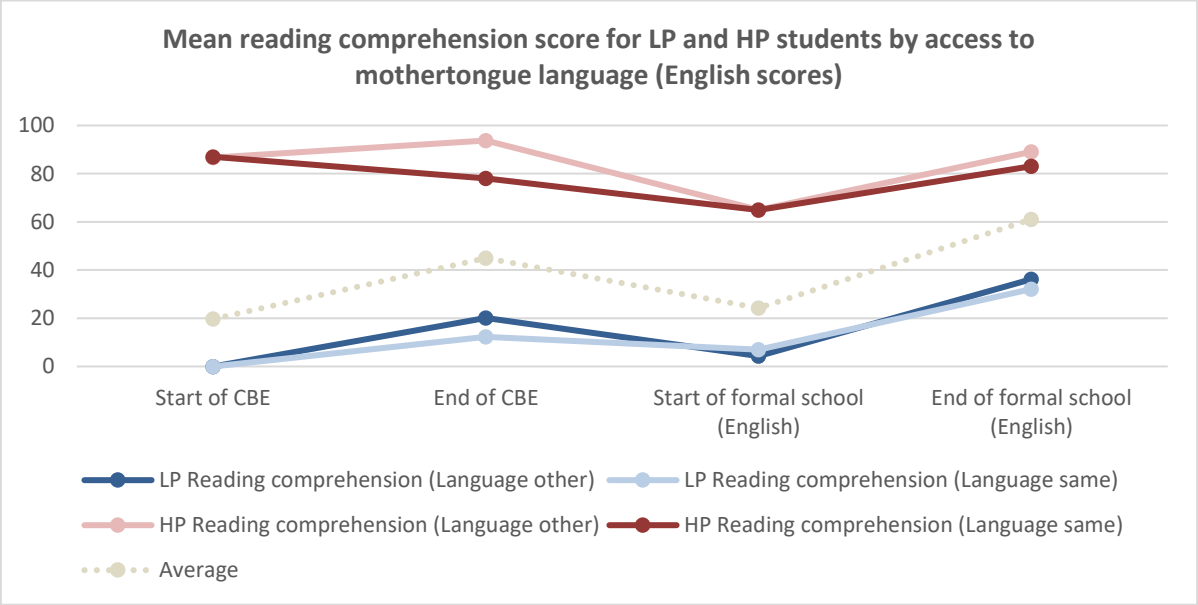
As shown in Figure 5, when low performing students began public school, students who transitioned into the same language were found to achieve higher results in reading comprehension for local language literacy compared to those who shifted into a different language. By the end of the first year of public school, this gap widened with the 'Language other' group achieving about 10 percentage points lower than the 'Language same' group. Results for both these groups, however, fell well below the average level of performance indicating that irrespective of language match, low performing students remained at the lowest end of the performance spectrum once they reached public school.

Figure 6 examines students' performance in English disaggregated by access to mother tongue language. For low performers, it can be seen that English scores were not dissimilar between 'Language same' and 'Language other' groups at both the start of public school and end of the first year of public school.

High performing students who were required to move into an instructional environment where the local language of instruction differed from their mother tongue did not differ in their scores from high performing students who had a language match at the start of public school. At the end of public school, scores were also comparable demonstrating that English progress was generally unaffected by high performing CBE student's access to their mother tongue language at public school.

[9] This was found to be the case for many high performing students who transitioned into schools where Kasem represented the main local language of instruction.

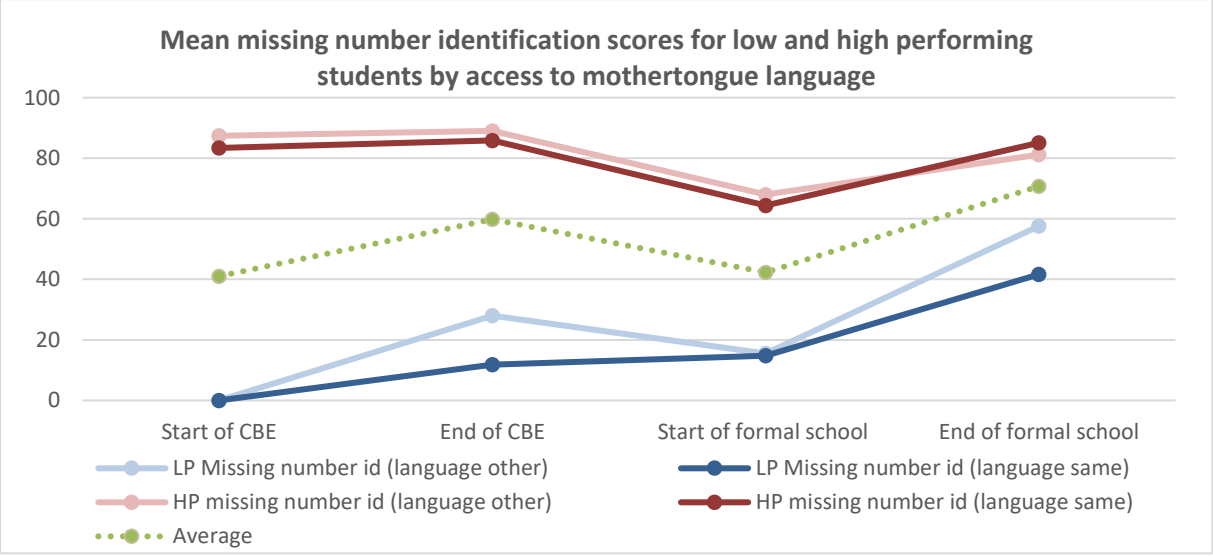
Figure 6: Reading comprehension score for LP and HP students by access to mother tongue



4.5.3 Impact of Mother Tongue on Numeracy Progress

For numeracy (See Figure 7 below), differences between results for low performing students from the 'Language other' and 'Language same' subgroups showed less than 2% discrepancy at the start of public school, indicating that low performing students were not affected in this numeracy subtask by access to mother tongue language in their initial public school experience. By the end of the first year of public school, interestingly, low performing students in the 'Language other' group showed higher mean percent scores in missing number than those in the 'Language same' group. Differences between both Language same and language other groups of high performing students were marginal (less than 5%) for the missing number identification subtask at both the start and end of the first year of public school suggesting the access to local language did not impact performance in numeracy for this subgroup.

Figure 7: Missing number identification scores for low and high performing students



4.5.4 Summary of Key Findings

Overall:

- The CBE cohort as a group perform well in local language literacy in public schools
- Low performing boys and girls show drop in performance in local language reading comprehension between CBE and public school
- High performing CBE transitioned students maintain progress in public schools in local language literacy

Achievements in English:

- High performing students make good progress well above average level of performance in English
- Low performing boys and Low performing girls demonstrate lower levels of progress

Achievements in Numeracy:

- The CBE cohort performance in numeracy was not affected to the same extent as local language literacy, when students transitioned into a non-mother tongue language. That is, students were able to retain some mathematics knowledge regardless of the language of instruction.

Disaggregation by Gender:

- Minimal differences were noticed between low performing girls and boys in learning achievements in public schools with both groups showing little learning gains
- Results of high performing boys and high performing girls for both local language and English language comprehension were comparable in public schools

Impact of Language of Transition School on Learning:

- 43% of the overall CBE sample transitioned into a language that differed from their mother tongue language
- Results of high performing girls and boys in English however show no differences between those able to switch into a school where the language of instruction differed from their mother tongue and those that do, did not

4.6 What Explains the Variable CBE Students' Improvements: Insights from Classroom Experiences

The evidence of the learning outcomes for high and low performing CBE graduate boys and girls indicates a markedly different trajectory for these groups. It is striking that low performers make little learning progress in public schools while high performers indicate consistently strong performance. An apparent exception to this however, can be seen within local language assessment performance, when high performing students are required to shift into a language that differs from their mother tongue.

These findings on learning outcomes relate to their relationships with their teachers and peers, their participation in instructional routines and overall confidence in learning processes which may have impacted, positively and more negatively, on their learning outcomes and achievements as identified in the quantitative analysis above.

4.6.1 The Classroom Experiences of High Performing Boys and Girls

Lesson observations and interviews with HPB and HPGs demonstrated their positive attitudes to learning across a range of subjects observed, including English, Maths, Science and Religious and Moral Education. Both groups showed high levels of enthusiasm and participation in learning routines. This was indicated by their attitudes of readiness to learn at the start of lessons, their observation of teacher's instructions for learning activities, and their willingness to and success in contributing to answering questions.

Both groups were observed to gain confidence from the affirmation they received from teachers and other pupils as a result of offering or modelling correct answers and being clapped for. Both these groups demonstrated a successful ability to navigate the tendency of classroom instructional procedures in public schools to privilege those able to offer correct answers to closed questions.

They almost all expressed a positive sense of making progress in their public school and took pride in their learning achievements. In this sense they recognised themselves as successful learners and appreciated that they felt recognised as such by their teachers at public school. Boys in particular expressed how they felt liked by teachers because they were able to answer questions and enjoyed the positive feedback received. Both groups articulated a strong commitment to collaborative learning with their peers to improve their understanding, often without prompting by teachers. Many during interviews recognised that their ability to do this had been encouraged during CBE.

While qualitative data indicated notable overlaps between the high levels of learning confidence displayed by these groups there were also some divergences in their approach to classroom learning. These are disguised in the quantitative findings which show both groups performing well. Thus, CBE HPGs were distinctive in articulating a high level of awareness of the need to follow teachers' instructions dutifully in order to facilitate and maximise their learning opportunities. It was striking that some HPG displayed a sense of superiority to other pupils they deemed not to be behaving properly, even rebuking some who were distracting them from their learning. It was also notable that HPGs group showed repeated concern to support the learning of other girls during classroom activities.

The overwhelmingly positive engagement of CBE HPGs and HPBs in their public school classroom learning helps to explain the quantitative evidence presented above which demonstrates their learning gains and in particular their consolidation during their first year at public school of the progress they had made at CBE in local language literacy, numeracy as well as in English. That HPGs displayed similar levels of confidence HPBs broadly supports the quantitative findings on the similar levels of progress made by both genders.

4.6.2 The Classroom Experiences of Low Performing Girls and Boys

By contrast, LPB and LPG demonstrated high levels of disengagement from learning, distracted behaviours and poor relationships with teachers which may account for very little progress in learning outcomes made by these groups. Both groups demonstrated a reluctance to participate in answering teacher led questions or listening to teacher's instructions. Many observations noted their failure to take part in chorus responses to teacher questions and a deliberate withdrawal from classroom routines. For instance, the following behaviours were typical of LPBs during teacher explanations and questions to the class during learning;

- Being without learning materials at start of lesson
- Playing with books and pencils or sticks
- Chewing biscuits or drinking water
- Being seated on desks rather than their chairs
- Looking through the window, at the floor or talking to friends
- Putting their fingers in their ears or their head on their desks
- Moving seats or fidgeting
- Refusing to follow instructions e.g. For copying down questions or homework
- Not returning to the class after break time

Moreover, LPBs were frequently reprimanded and punished for disruptive behaviour by their teacher or the class prefects which undermined their ability to develop positive relationships with them. Such instances underscore how the more negative relationship to public schooling of this group in particular was in part influenced by their experience of being disciplined and punished leading to their sense of alienation.

However, it was notable that such behaviours often occurred during the middle of lessons or towards the end after an initial attempt to follow the teacher's instructions and to participate followed by frustration and increasing evidence of disengagement from learning when they made mistakes or could not understand or were unable to participate in the whole class question and answer pedagogical format of public schools.

Both low and high performing articulated their sense of being demotivated and demoralised by their classroom experience. However, from interviews during which these groups reflected on their classroom experience, it was evident that LPGs were the most marginalised from the instructional routines of public schools. They demonstrated not only patterns of social withdrawal but also anxiety

and frustration at their inability to understand or successfully participate in answering questions resulting in classroom experience which they found hurtful, exclusionary and sometimes embarrassing. Many lesson observations of CBE LPGs showed their frustrated attempts to participate despite a lack of understanding of teacher explanations or questions. This often resulted in them getting the wrong answers or being unable to answer.

For both these groups, lack of learning success bred lack of confidence and disengagement. However, it was also striking that LPGs were distinctive in showing reflexivity in talking about the strategies they had developed in CBE classrooms which they believed helped them to navigate the instructional routines of the public classroom and in particular to disguise their lack of understanding and experience of failure. Thus, one LPG noted that she put her hand up when asked by the teacher, believing that by doing so she would not be asked to contribute.

The lack of learning progress made by both these groups as demonstrated by the quantitative findings thus corroborates insights into their experience of the classroom in public schools that point to poor levels of engagement with instructional routines which may explain this. Moreover, some LPGs accepted failure as an inevitable aspect of their learning experience which they had to plan for in order to survive without embarrassment in the classroom. Bringing the qualitative insights into the subjective responses of LPB and LPG into relation with the quantitative evidence of the poor performance of LPGS in public schools thus reveals their poor experience of transition in relation to their learning experiences and learner identity. It was notable that during lesson observations there were few attempts by teachers to support either LPGs or LPBs either by identifying their particular needs or by providing individualised encouragement or by creating a learning environment in which they felt included.

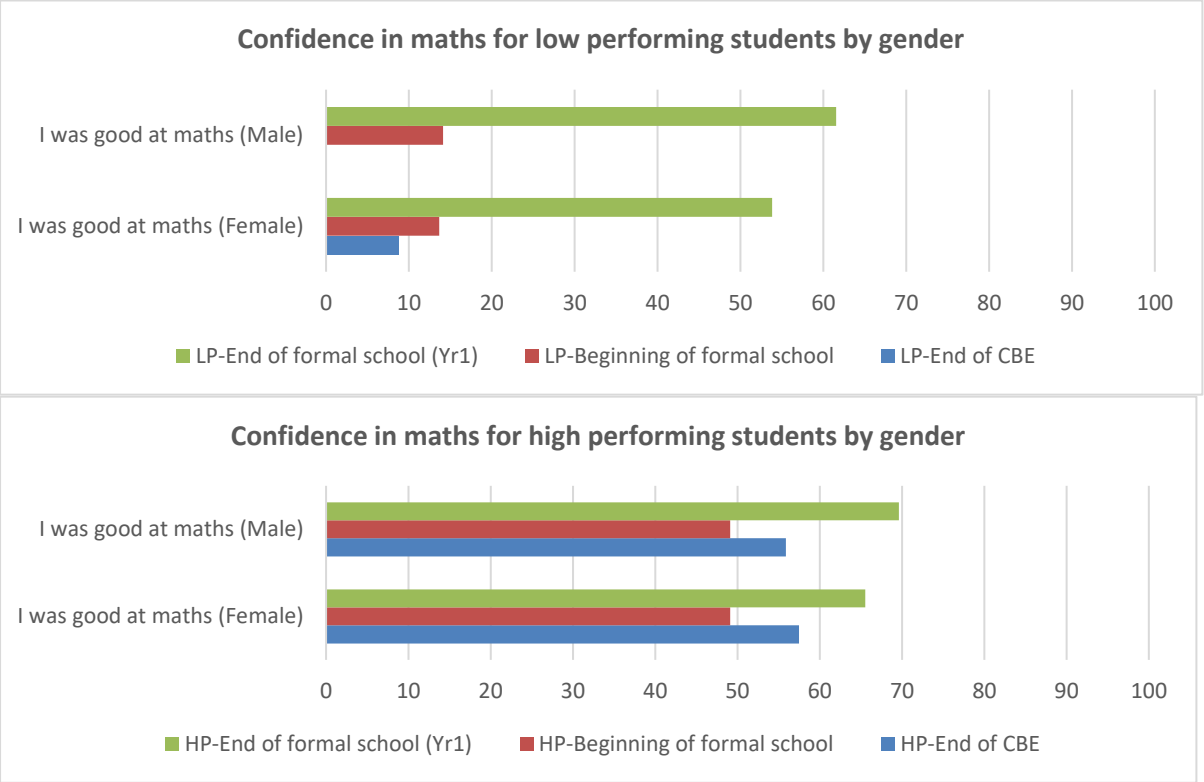
4.7 Subject Achievements of CBE Graduates and their Experiences of Learning

The next section brings insights from the qualitative data into relation with the quantitative data on subject-specific learning outcomes and progress and in particular the extent to which prior achievements made by CBE graduates were consolidated during their transition into public schools. Here a key issue explored was the extent to which CBE graduates were able to build upon and repurpose skills and knowledges they had learned during their CBE experience in public classrooms. Also of relevance to understanding CBE graduates developing identity as learners was the resonance of CBE's attention to developing local language skills with the social practices and values of families and local communities. Applying a mixed methods approach to understanding subject specific engagement of CBE graduates has important implications for understanding how pedagogical practices during CBE support the transition of CBE pupils by providing knowledge, skills and strategies for learning which supports their resilience and successful learning in public schools.

Within the child survey for the CBE Cycle 4 Tracker Study, when students were asked about their confidence in numeracy, though no low performing male and few female students indicated they felt they were good at mathematics at both the end of CBE and the beginning of public school, more students did give positive responses at the start of public school. It suggests that the CBE programme may have boosted the confidence of some low performing learners and transitioned into public schools with such confidence. After one year in public schools, a lot more low performing students (over half) reported positive responses in regard to confidence in mathematics suggesting that with time, low performing CBE graduates are able to build upon their self-efficacy in this subject.

For high performing students, whilst most felt confident, slightly fewer male and female students reported feeling confident in numeracy at the start of public school, compared with the end of CBE. The difference in this result may be due to high performing students being more aware of their abilities relative to their peers upon their initial transition into public school. For example, whilst in CBE they were the highest achieving students amongst their cohort, upon entry into public school they may have had more peers performing at or above their level of ability. By the end of the first year of public school, however, many more high performing students reported feeling confident in mathematics, a finding which demonstrates that overtime, this cohort of students successfully adjusted to the demands of their class and felt comfortable with their numerical skills relative to those of their public school peers.

Figure 8: Confidence in performance in maths – low and high performing students by gender



The quantitative data on achievements of CBE graduates in numeracy at the end of CBE and at the start of public school indicate that all achievers consolidated their learning in this subject, albeit with differential levels of achievement between low and high performers. Whilst evidence from the Cycle 4 Tracker data showed that CBE students, on average, performed better in their overall scores for numeracy, compared with both local language literacy and English. This difference was difficult to detect in the current analysis which only examined one subtask for numeracy and literacy.

Overall, quantitative findings in numeracy are supported by the insights which were generated by interviews with and observations of CBE graduates. All learners, including high and low performers of both genders, expressed positive attitudes and confidence in their ability to engage in Mathematics lessons in public school. This was based on the continuities they recognised with their prior CBE experience and their ability to apply and repurpose skills they had developed. Thus, one LPB noted that *"Yes I do enjoy numeracy lessons because I understand it better and it is a repetition of what was taught in the CBE classes".* When asked about making progress in Mathematics another LPB noted how he experienced public school was a direct and meaningful extension of his prior learning. *"Yes, I feel so because at the CBE we were introduced to division, subtraction, addition and multiplication but now there is the introduction of examples and many others. I do understand what the teacher teaches".* Many shared the viewpoint of one HPB who noted that *"I was active in my maths class because it seemed more familiar to me because of the numeracy classes at the CBE".*

Some pointed to particular activities in CBE which they believed were useful in their transition to learning Mathematics such as one LPG who noted that "*counting has helped me so much in the public school*". The emphasis of CBE on functional numeracy was also not lost on the CBE graduates. One HPB noted that maths was his favourite subject in public school because "*Maybe in real life one can be given money for some transactions and this is where maths would become useful to me and so I like maths for this reason*". All groups were confident of their ability to access and understand Mathematics in public schools as a result of their recognition of these continuities. Teachers also observed that CBE graduates were better prepared for their engagement with Mathematics than for other subjects at public schools, noting that they performed better in "calculating subjects like Mathematics" rather than in "reading subjects".

4.7.1 Local Language Literacy

As shown in Section 3 of this report, overall, CBE students outperformed students already in public school in their achievements in local languages at the start of public school and showed comparable performance by the end of their first year in public schools.

Such learning successes align with qualitative findings that revealed the enthusiasm for learning local languages expressed by all groups of CBE graduates based on their valuing of the personal and social confidence and improved status in their communities which they believed had resulted. Thus, some spoke of their participation in bible readings or local community reading competitions while their families and the wider community expressed particular appreciation of this learning outcome as something which contributed more widely to community life. Developing fluency in their local language was thus recognised as an aspect of their cultural identity which CBE had recognised and nurtured. This was an important feature of the broader social confidence which they brought to their participation in public schools. In transitioning from CBE to public school, CBE graduates, in particular HPB and HPG, therefore brought social confidence which they had gained from a learning experience that addressed and recognised them as members of their local communities, able to exercise agency by becoming involved, as a result of their local language proficiency, in valued community practices

Moreover, the relevance of local language fluency to CBE graduates' sense of self-confidence as learners is also underscored by the marked drop in performance in local language literacy shown when high performing students do not transition into schools where their local language is spoken by teachers. Many CBE graduates expressed appreciation for teachers who switched languages from English to their local language to enable them to understand. On the other hand, the inability of some public-school teachers to switch from English into their local language and thus give them entry points into learning when they had difficulty understanding, was perceived as a failure to meet their needs. One HPG noted that "*in CBE we were taught in Ewe but here it is Twi and English. Our teacher does not understand Ewe".* Another observed of their teacher that *"this was the first time in the community and she did not know the local language".* Given the associations made by CBE graduates between recognition of their local language and their confidence and identity as learners, the drop in performance may reflect this underlying factor and be symptomatic of resentment by CBE graduates of the inability of schools and teachers to recognise their needs and identity as learners.

4.7.2 Learning English and the Connection with Local Language Instruction

All CBE graduates found learning in English challenging and that this was a particularly challenging aspect of the transition. All noted how this made it difficult to understand their teachers as well as to express themselves in response to questions posed by the teacher to the whole class. This meant that they were sometimes unable to participate in instructional processes. Many teachers noted that for many CBE graduates, the use of English as a medium of instruction was challenging, making it difficult for them to access lesson content and ask questions and express themselves. One noted that "*as for English they are very down, totally down*".

However, while the results in English of low performers testify to difficulties faced, the English results of HPB and HPG CBE graduates attest to their ability to make progress in this subject despite the challenges. These findings on learning outcomes aligns with the insights from lesson observations and interviews which revealed that these groups were able to repurpose language learning skills, in particular syllabic and phonetic methods which they had developed in CBE when learning their local language while learning English. In particular the ability to break down words into vowel sounds. Many spoke of drawing on their prior experience reading words at CBE, learning word sounds when learning English. Typifying such an ability to transfer learning in this group one HPB noted that *"I was taught word and sentence formation, so when I am given an assignment here that is not easy for me, I usually recollect what I was taught in the CBE then transfer the knowledge and it will help me to do it"*. This underpinned their confidence in engaging with English and their sense of making progress as well as a sense of continuity between learning English and their knowledge of pronunciation and structure of local languages. Teachers also confirmed that the experience of prior learning in their mother tongue language had provided useful knowledge about language structure which was useful in their learning of English.

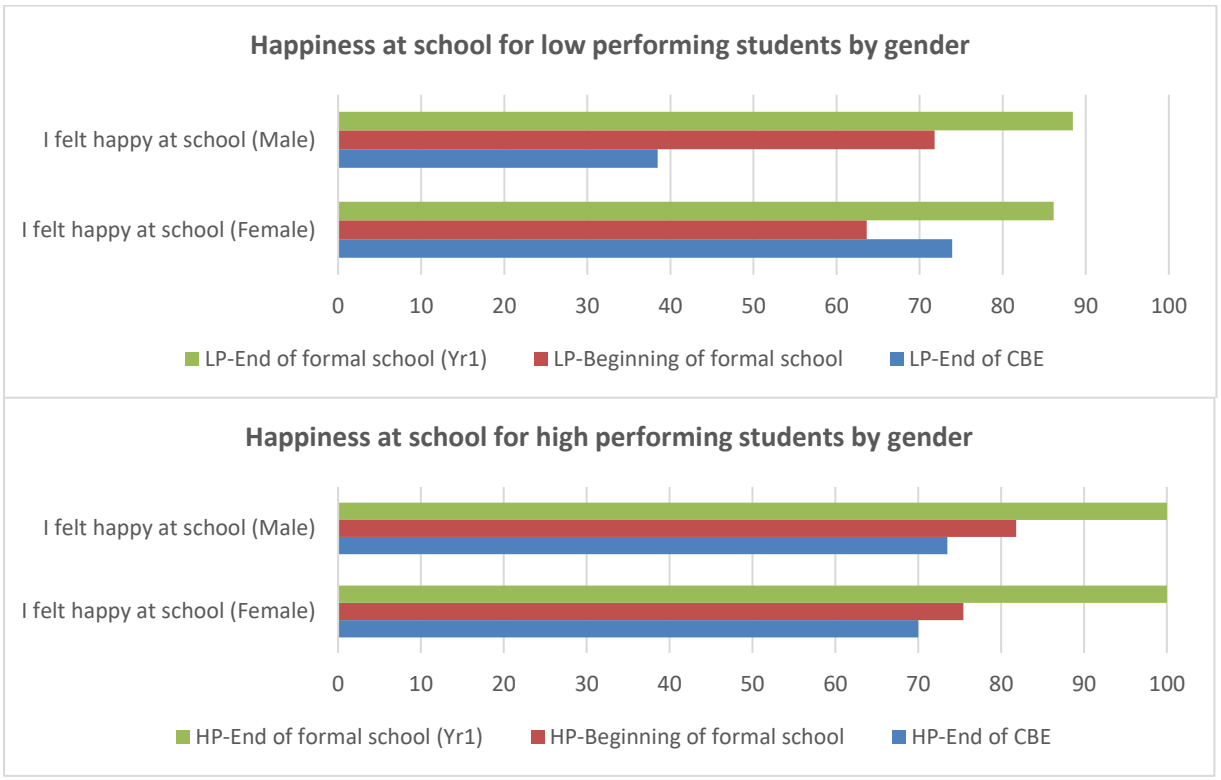
Moreover, it is striking that the quantitative data suggests that there was no notable difference in the achievements of high performers in English who transitioned into schools where teachers used their mother tongue instruction and those who did not. This further corroborates the qualitative data evidence which showed that the methods of learning local language literacy as well as the local language content,

had important and lasting learning dividends when high performing pupils transitioned to public schools in English.

4.7.3 CBE Graduates Attitudes to their Transition from CBE to Public School

This section draws on qualitative data which elicited CBE graduates' views on their relationships with their peers, the challenges they face in familiarising themselves with a new school environment and their ability to navigate these challenges. Quantitative data includes surveys which questioned CBE graduates about their happiness and motivation at public school by comparison with CBE.

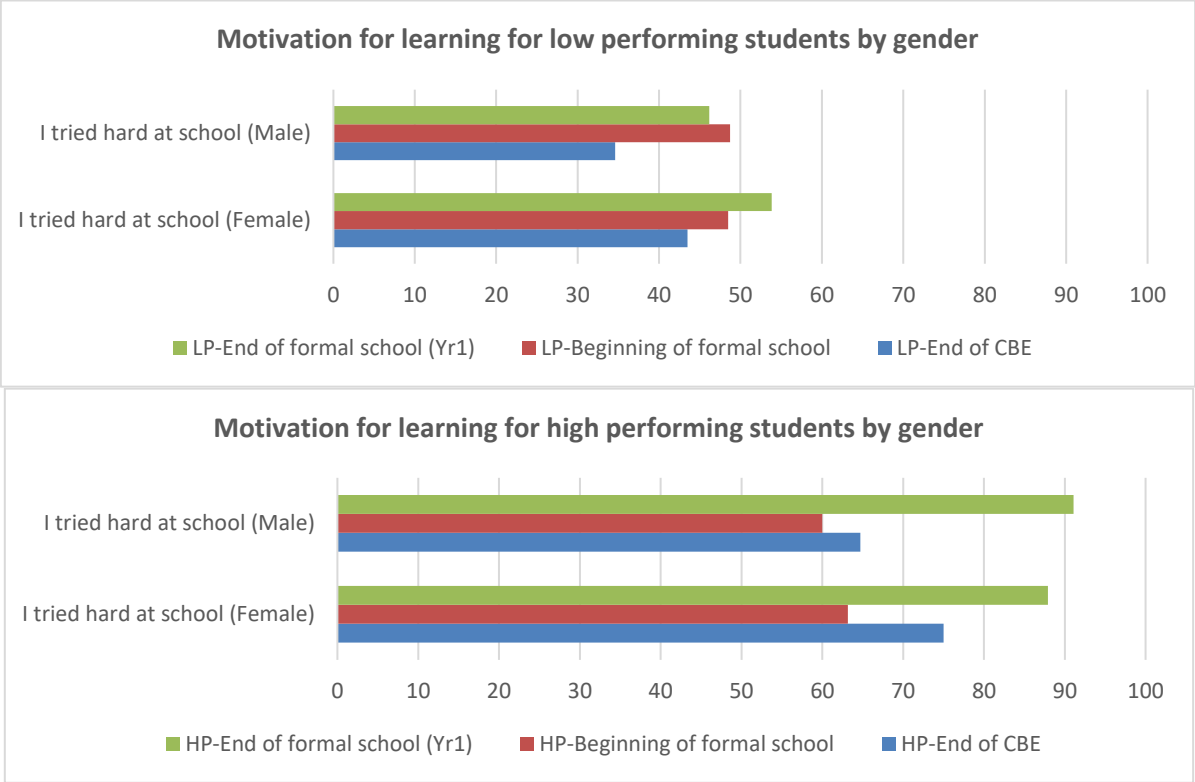
Figure 9: Happiness at school - low and high performing students by gender



Figures 9 show positive responses (represented as 'agree' or 'strongly agree') from male and female students on the two aforementioned items of the Child Opinions section of the child survey administered at the end of CBE, start of public school and end of the first year of public school. As can be seen from both figures, high performing students mostly reported more positive responses compared with low performing students at both the end of CBE, start of public school and end of the first year of public school, irrespective of gender

For the question related to happiness at school, whilst differences between positive response rates for high performing girls was modest at the end of CBE and start of public school, over 10 percent more low performing girls reported being happy in CBE, compared with low performing girls at the start of public school. For male low performing students, however, the inverse was found, with more students reporting being happy at public school, compared with CBE. Higher achieving males similarly showed a higher percentage of students who reporting being happy at the start of public school, compared with CBE. By the end of the first year of public school, both male and female low and high performing CBE students showed increased rates of positive responses for happiness at school, a result which suggested that the transition into public school became easier and more enjoyable for CBE students with time. For example, the entire sample of high performing students reported that they were happy at school all or most of the time. Similarly, over 80% of low performing students responded positively to this question at the end of their first year of public school.

Figure 10: Motivation for learning – low and high performing students by gender



When students were asked if they tried hard at school, whilst low performing girls had only marginally more students responding positively at the start of public school, compared with the end of CBE, larger discrepancies were observed with low performing male students, with 34.6% stating they tried hard in CBE and 48.7% responding positively to this question in relation to public school. For high performing students, however, a greater proportion of both male and female students indicated they tried hard in CBE, compared with the beginning of public school. By the end of the first year of public school, though high performing students, both male and female, showed an 85% positive response rate for this question, low performing male (46.1%) and female (53.8%) students showed similar frequencies to the beginning of the public school year, indicating that over time, motivation for learning for low performing students remained, largely unchanged.

The next section discusses the qualitative insights which help to unpack and illuminate these survey responses on happiness levels which may be conditioned by multiple factors affecting the attitudes of CBE graduates.

4.7.4 Qualitative Insights: Attitudes and Experiences of CBE Graduates to Public School[10]

The data on happiness suggests that the transition for the CBE graduates as a whole cohort was not an unhappy experience for the majority of CBE graduates, despite some divergent experiences of groups as discussed below. Various insights emergent from the qualitative data may explain this.

When CBE students dramatised lessons in public and CBE classrooms, it was striking that all CBE graduates suggested that despite differences such as language of instruction, singing and wearing their uniforms*, the structure and instructional processes of the lessons they encountered was essentially similar*. Both learning environments were associated with teacher-led questions to the class, clapping for those able to answer, chorus responses and a clearly defined beginning and end. Speaking of public school, one HPB summarised this experience of continuity noting that "*it's different sometimes*" adding that "*but also it's the same".* Thus, the characterisation of the CBE and public school classroom reflects the instructional sequences identified in the analysis of the CBE pedagogy.

All CBE graduates brought to their experience of public school positive memories of their prior experience of learning during CBE. This seem to come from their sense of pride in their local cultural

[10] For further contextual background, please see Higgins and Akyeampong's (2018) qualitative research report.

identity from having developed knowledge and fluency in their local language. Many also were conscious that their experience of CBE had given them learning skills and strategies to find out new things and take pleasure in extending their knowledge. Some noted that they had developed useful learning strategies such as working collaboratively with their peers or the ability to ask teachers questions which gave them a sense of purpose and self-efficacy as learners.

The differences between CBE and public school were welcomed by many CBE graduates as a new and positive challenge. Thus, the wider curriculum of public schools was recognised with some excitement. *"In CBE we only had literacy and numeracy but now we have so many subjects"* said one LPB. The greater number of pupils and teachers was also noted which was welcomed by many as an opportunity to make new friends. *"I have made friends with both the CBE and the public school pupils"* said one LPG. Many appreciated the opportunity to use new learning materials in their public setting. *"We were using only pencil now we use pencil and pen"* noted one HPB. Another noted that *"I see pens, books and other things that make me feel happy"*. Others noted that they used mathematical sets in public schools but *"only counters"* in CBE. For some, the new equipment meant a positive and interesting experience of familiarising themselves with routines such as *"sucking the ink of a pen to make it flow"* (HPB).

Over 75% of HPBs and HPGs reported they felt happy in public school. This finding aligns with the insights from qualitative data in particular interviews and focus group discussions with these groups which as noted above revealed their positive attitudes to classroom learning as well as to their peers and the wider environment of public schools. Success in their learning generated personal confidence for these groups which impacted their approach to their public school experience more generally. Notably, teachers gave both these groups positions of responsibility as prefects, class captains and bell ringers suggesting teacher's recognition of their potential as leaders.

By contrast, the quantitative evidence indicates that fewer LP boys and girls reported being happy in public school compared to CBE with LPGs having the lowest rates (63.6%) of positive responses.
This also aligns with insights from qualitative data as noted above which showed that LPBs and LPGs demonstrated more negative attitudes in public schools. This was in part due for both groups to their lack of positive participation and disengagement from instructional routines noted above which resulted in a loss of confidence in relation to their school experience. Thus, LPBs showed distracted behaviours and poor relationships with teachers as a result of being reprimanded. LPGs showed considerable levels of anxiety and distress at their inability to understand or participate and expressed fear of humiliation and also, unlike LPBs, showed signs of social isolation and withdrawal by not interacting with either teachers or pupils.

A key dimension of happiness at public school, according to CBE graduates within the qualitative findings, was their friendships. The greater number of pupils at public school as opposed to CBE was welcomed by many as an opportunity to make new friends and to extend their community-based friendships. *"I have made friends with both the CBE and the public school pupils"* said one LPB. This was a key aspect of their enjoyment of public school amongst all CBE groups. Many thus spoke warmly of the friends and in particular emphasised the benefits to their learning of being able to collaborate with them outside their class time.

However, while for high performers such relationships were one positive dimension of a positive experience of schooling, for low performers these friendship groups were often a positive experience that compensated for a more negative experience. Thus, it was noticeable that despite poor relationships with their teachers LPBs enjoyed socialising with other boys, CBE and Non-CBE in their public schools. This aligns with the quantitative data that suggests that LPBs reported being happier at public school (71.8%) than at CBE (38.4%). Saying they are happier in public schools than in CBE seems to be mainly because of larger friendship groups. LPGs were frequently shy and isolated during lessons, but they found support from their friendships with other girls outside of the classroom. For this group, their experience of small friendship groups after lessons often seemed to offer a space for more positive and nurturing socialisation experiences after their negative and at times distressing experiences in the classroom.

Challenges faced by CBE Graduates at Public School

The chart below summarises the challenges faced by CBE graduates when attending public school, all of which caused them distress and frustration.

Table 13: Challenges of CBE Graduates

In School Factors	Out of School Factors
Navigating: • The rules and requirements of public school • The need to wear school uniforms • Serious ethos of public schooling • Corporal punishment • The need to bring learning materials	**Navigating:** • Attendance at school with household and family or farming demands due to longer school days • Hunger • inability to study at home because of lack of electricity or resources

Family Contexts of Transition

A holistic understanding of the transition of CBE graduates to public schools involves attention to how their navigation of a shifting educational context impacts on their families and communities who affect and are affected by their children's transition. In this section, we bring together qualitative and quantitative data on two key contrasting aspects of family responses to their transition, firstly the challenges resulting from financial hardship and secondly the potential for families to support learning in their homes and communities.

Poverty and the Challenges faced by Families of CBE Graduates

Within the baseline CBE Cycle 4 Tracker Study data, which compared socio-economic and demographic characteristics of CBE children compared with children already in public school, results from a logistic regression analysis found that CBE children were significantly less likely (by 47%) to be in the high quartile wealth index, compared to the low quartile. This was found after controlling for a number of confounding factors.

Almost all families, especially subsistence farmers and petty traders, emphasised their poverty and financial difficulties as a key factor undermining their ability to support the CBE graduates. Many drew attention to the unpredictable yields from their farming which meant that their finances were always precarious. Financial challenges included the costs of uniforms, books, learning materials, school fees as well as providing daily amounts of money to enable their children to buy food. These financial difficulties caused considerable daily distress and anxiety and consequent uncertainty about their future ability to support their children in public.

Such anxieties indicate that parents associated their success in supporting learning in public school – and the progress of their children there - with their ability (or not) to provide material things such as learning equipment and even more importantly the school uniform. Many emphasise the struggles and sacrifices they were making to be able to give the practical support to their children to attend school. This sometimes involved borrowing money, buying uniform on credit, repeatedly taking damaged uniforms to local tailors, using the money gained from petty trading or selling livestock or firewood to buy books. Given the financial implications, their children's experience of transition into public school was thus associated, by many families, with a sense of personal inadequacy and powerlessness, highlighting their lack of resources.

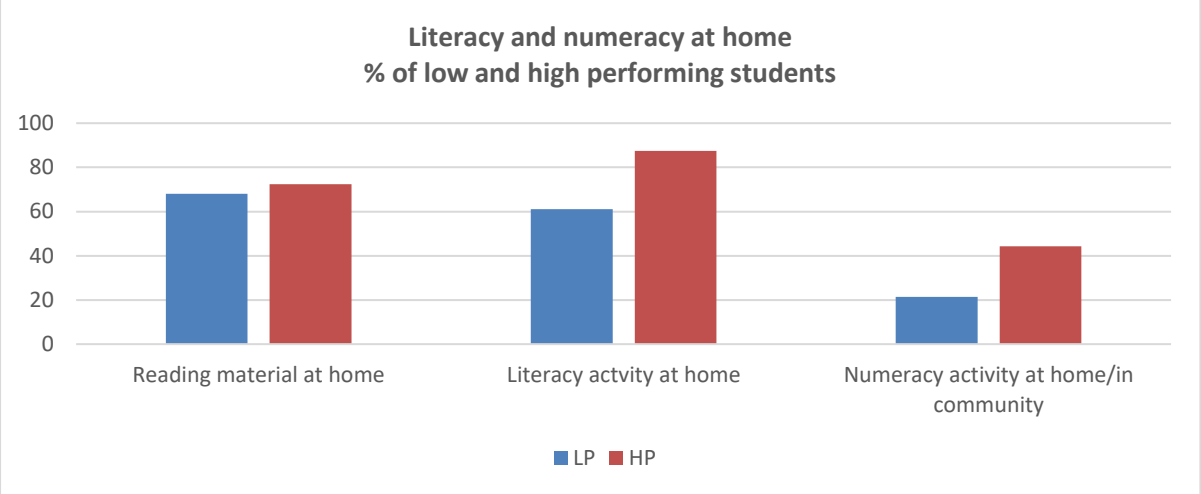
Despite such economic difficulties, many families of CBE graduates were often enthusiastic to support their children's transition because of their appreciation of the social, cultural and practical benefits of learning to their children, themselves and the wider community. One way in which some did this was to encourage them to read at home. Indeed, for many the experience of seeing their children learning at home through reading activities as a result of CBE was an important motivator for their commitment to the transition. This experience in particular impacted positively on perceptions of the value of schooling for girls. Some parents expressed pleasure that their children had studied at home after CBE." *The programme is beneficial because when they were in CBE class they were studying they were doing good and reading to our hearing when they came home"*.

Quantitative data below indicates that high performing students engaged more with learning within their home environments. This supported qualitative data showing that families of HP students in particular expressed enthusiasm to support their children's learning at home. It also supports findings that HP students will actively engage in learning opportunities outside of school as well as social activities such as bible reading which contribute indirectly to their learning. Moreover, some families were proud that their children could assist them with managing money and understanding technology.

Figure 11 focuses upon three survey questions that were asked to CBE children at the start of public school. These were as follows; Do you have any books or reading material at home? Do you do any

activity at home that involves reading or writing? Do you do any activity at home or in your community that involves counting? In comparing the percentage of low and high performing students who answered 'yes' to this question, minimal difference was observed for the first question relating to access to home literacy materials. For the latter two questions concerning involvement in literacy and numeracy activity, however, larger discrepancies were found. Whilst 87.5% of high performing students (in literacy) claimed they engaged in home reading or writing activity, only 61.1% of low performing students responded positively to this question. Moreover, a larger proportion of high performing numeracy students (44.6%) claimed that they took part in counting activities in their home or community, compared with low performing students (21.43%).

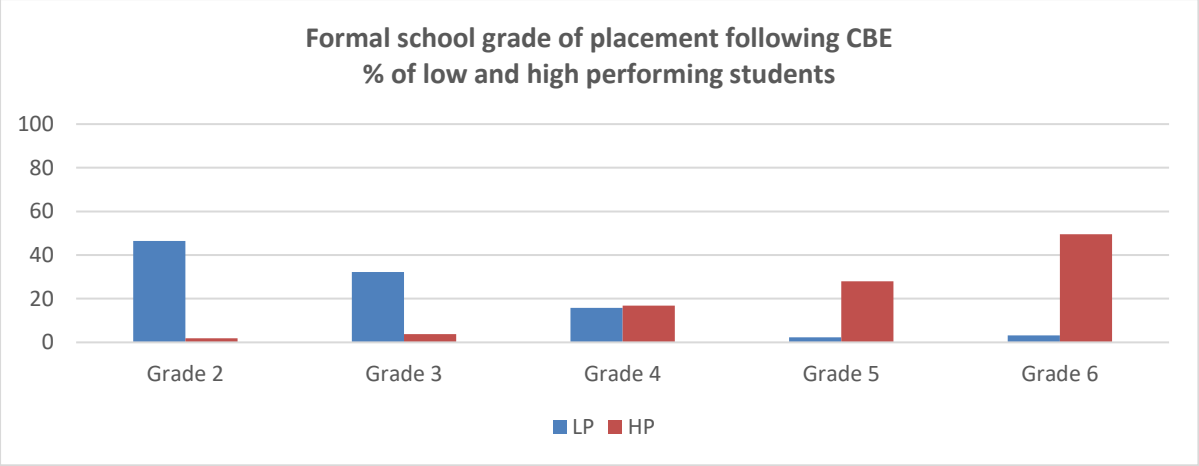
Figure 11: Literacy and Numeracy at Home



Management of Transition to Public School

Figure 12 displays the percentage of CBE students, who were identified as low and high performers, and their grade of placement at the beginning of public school. As can be seen, the majority (46.4%) of low performing students were placed in Grade 2 following completion, with smaller frequencies in Grade 3 (32.3%), Grade 4 (15.7%), Grade 5 (2.4%) and Grade 6 (3.1%) This demonstrates, that in general, students identified as low performers were placed appropriately given their level of ability at the end of CBE and that CBE facilitators' judgements and the results of a transition test were well considered during the transition process. For high performers, an inverse relationship can be seen. Most students (49.5%) were placed in Grade 6 following CBE completion, with respectively fewer students found to be each consecutive, lower grade. This further demonstrates that high performing students were placed accordingly into public school at the end of CBE. In regard to gender differences, the same pattern of results was observed for male and female students.

Figure 12: Public school grade of placement for low and high performing CBE students



In the light of the insights on the close relationship between mother tongue language and learner identities, the failure of CBE graduates to be allocated to schools where there is a language match is

likely to undermine the confidence and potential to learn in public schools of CBE graduates. As found in the Cycle 4 Baseline Tracker data, 43% of children were found to transition into a language that differed from their mother tongue language. Addressing the issue of school allocation will depend on improving liaison between public schools and the CBE administration.[11] Many Headteachers and teachers interviewed believed that their ability to support the transition of CBE graduates could be enhanced by better liaison with CBE administration in managing the educational and social processes and challenges involved. This in particular would include exchanging information on CBE graduates and identifying their particular learning needs, developing support structures in public schools to integrate incoming CBE graduates, thereby building on current good practices already being implemented by teachers.

Current Teacher and Headteacher Interventions

Teachers and headteachers confirmed both the benefits of prior learning and also the challenges faced by CBE graduates and their families. It was notable that they were developing a range of pastoral and pedagogical strategies to support incoming CBE graduates. These included:

- Arranging meetings with parents to try to address issues caused by poverty or to get to know the causes of absenteeism;
- Leniency with application of school rules and punishments given CBE graduates lack of familiarity with them;
- Giving CBE graduates positions of responsibility to integrate them into school life (this corroborates earlier findings in relation to HPB and HPG);
- Giving academic awards to CBE graduates;
- Using grants where possible to assist families to buy shoes and uniforms;
- Personal interventions with teachers sometimes giving food or exercise books to individual students;
- Orientations provided to CBE graduates to familiarise them with school ethos and expectations;
- Ensuring follow up meetings with parents and families to check on progress and family contexts that might undermine their attendance and concentration in school.

[11] Although it's worth noting there may not always be a school with matching language in the area.

5. Key Messages and Policy Implications

The findings of this study on CBE in Ghana provide the strongest evidence of the impact the programme can have on improving learning and access to public schools for out of school children. Overall, the evidence suggests that it is possible to provide a successful route to public education for out of school children through an accelerated learning programme based on mother-tongue instruction. It also shows that this approach is able to close the learning gap between out of school children who have had CBE and their public-school counterparts and are also able to thrive in public schools.

The fact that children who have missed most part of early primary education can make fast and deep learning in acquiring basic skills in both CBE and primary schools also highlights the importance and power of the CBE instructional pedagogy. In less than a year, the CBE programme is able to improve learning of children who had either dropped out of school or never attended to the point where they perform at the same level or better than children who have already had at least three years of primary education. It achieves in less than a year, what three years or more of public education achieves, and gives hope, not only to the prospect of closing the learning gap between out of school children and children already in public schools, but also the possibility of reducing dropout due to poor learning in public schools if the CBE pedagogy can be adopted there.

Elements of the CBE pedagogy that were critical for this achievement included: use of the syllabic and phonetic methods of learning local language, collaborative learning and connecting learning with everyday life experiences of learners in a way which makes learning meaningful and enjoyable. Overall, there are three distinctive achievements of the CBE programme in Ghana:

- CBE students make sustained educational trajectories – out of school children are able to catch up on basic literacy and numeracy skills gaps and make successful transition into public schools;
- CBE students improve basic literacy and numeracy skills and outperform Non-CBE students in public schools – remarkably, CBE students are able to leverage the gains in their learning to outperform, in most cases, Non-CBE students in public schools. They also able to make smooth transition to English by utilising Ghanaian language literacy skills acquired in CBE;
- CBE builds resilience during transition to public school – there is 'staying power' in the CBE instructional experience. Students are able to draw on the positive learning experiences to successfully navigate the public-school learning environment with its typically large class size and didactic instructional approach.

The study has shown that not every CBE child progresses at a higher and faster rate. It reveals the importance of paying attention to the learning needs of low performers, and in particular if they are girls, to close the learning gap between them and higher achieving boys and girls. Successful education communicates positive messages to local communities and parents. The message from this is that, at both CBE and public schools, facilitators and teachers need training to identify and offer support to low performing CBE students to avoid the risk of dropping out of school. Many of the parents of the CBE students expressed deep satisfaction with CBE because they could 'see' tangible evidence of improvement in learning.

Table 14 summarises the key issues from the research, the positive lessons and implications for specific policy issues. Overall, it shows that CBE graduates have a distinctive learning experience that shapes their responses to education in public schools. Other lessons are: the importance of engaging the community to actively take part in education delivery; use of local facilitators, but also the need to motivate them and offer support through training. Also, local language is key for sustainability of quality education, so maintenance of the use of local language as the main medium of instruction in lower primary should be strongly encouraged. It is also important to be able to monitor and evaluate learning consistently to understand who is making progress in learning and what could be done, in time, to address learning needs. Training teachers to interpret classroom learning assessment data disaggregated by gender will help to catch students who are falling behind and offer them remedial instruction or support in the classroom.[12]

[12] For further detail on this finding, please see Higgins and Akyeampong's (2018) qualitative research report.

Moving forward, it is important for the Government of Ghana to seize upon the knowledge and strategies developed to ensure that all out of school children have access to quality education through the CBE route. The research has shown that enrolling children who have either dropped out of school or never been to school in a CBE programme before they transition into public schools provides them with the opportunity to catch up on basic literacy and numeracy skills gaps.

Two recommendations for Government of Ghana to support CBE and utilise its benefits to improve early grade primary education should focus on:

- Financial - financial commitment to support and extend CBE to areas with large out of school population will be a commitment to meet Sustainable Development Goal (SDG) 4 – providing access to equitable quality education for all. This means including a programme of education that targets out of school children in other parts of the country using the successful approaches that the CBE programme has used to ensure that they receive equitable quality basic education in fulfilment of SDG 4.
- Include CBE into medium term local government plans – CBE could be considered in national and district level education improvement strategy and captured in strategic plans in education. Education policy makers in Ghana should also consider expanding CBE within districts that are currently operating and started in other districts that have large population of out of school children. The GoG through the Ministry of Education/GES should use the lessons from the CBE programme to manage an expansion to other districts with out of school children, and also the GES should be encouraged to work with some of the IPs to extend knowledge of the CBE methodology and pedagogic approaches to early grade teachers in public primary schools

Table 14: CBE Lessons and Policy Target

Issues	Positive Lessons	Key Issues and Policy Targets
CBE Pedagogy	• Building on current good practice in literacy and numeracy teaching • Creating confidence in learning • Community Links • Collaborative Learning	• Targeting the needs of all students (male and female; low and high performing) during CBE and in transition to formal school • Ensure better liaison between CBE facilitators and formal schools
Language of Instruction	• Mother tongue enables the achievement of basic literacy and numeracy • Mother tongue enhances a positive learner identity and facilitates transition	• Transitioning into a different language impacts progress • Facilitate transition into mother tongue instructional environments
Gender	• High performing boys and girls showing equal progress • Collaborative learning between low and high performing girls in both CBE and primary schools	• Low performing girls at risk • High performing girls underchallenged • Incorporate gender sensitive pedagogical practice, especially for low performing girls
Low and High Performing Students	• Both high and low performing learners show sound progress over time • High levels of confidence found in high performing learners	• Use of assessments to identify learner's ability • Promote mixed ability learning activities

The following are key programmatic and policy recommendations:

Pedagogy

- Build on current strengths identified in CBE pedagogy to ensure that pedagogical strategies during CBE support CBE graduates in navigating the demands of particular subjects in public schools e.g. continuities between numeracy in public schools; phonetic and syllabic approach to teaching language so that all pupils have confidence to repurpose skills when learning English and not just high performers;
- Strategise to recognise and meet the learning and social needs of low performing boys and low performing girls in particular within CBE;
- Build on links to home learning already established in CBE pedagogy.

Managing the transition process

- Support teachers in meeting the needs of diverse groups of CBE graduates and build on current pastoral strategies;
- Promote better liaison to ensure school allocations take account of CBE graduates mother tongue language;
- Ensure that appropriate methods are in place for determining low and high performance;
- Ensure a systemic action plan is drawn up for low and high performers which involves CBE facilitators, teachers at public schools, students and their parents.

Meeting distinct needs of diverse CBE graduates

- Devise strategies to meet the needs of low performing boys and low performing girls to enhance their confidence, happiness and resilience in public schools.

Community and family contexts of learning

- Build on families' enthusiasm and integrate them to support learning by supporting and resourcing spaces of opportunity for learning in communities e.g. libraries where CBE pupils can continue learning and reading out of school. Integrate these strategies into CBE so good habits for home learning are established before public school.

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Past Research Reports Commissioned under this Research

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Appendices

Appendix A

Table 15: Within group gender differences in component scores at baseline and endline for CBE

	CBE (Female)			CBE (Male)		
Component Scores	**Baseline mean percent score (%)**	**Endline mean percent score (%)**	**Change in score (% points)**	**Baseline mean percent score (%)**	**Endline mean percent score (%)**	**Change in score (% points)**
Local language						
Basic local language	20.2	44.1	24.0	18.8	48.5	29.7*
Advanced local language	25.6	56.3	30.8	26.8	59.2	32.3
Overall local language	26.1	54.2	28.1	25.9	57.3	31.4
English						
Basic English	25.3	54.0	28.7	23.8	57.0	33.2*
Advanced English	30.7	66.0	35.3	30.2	66.1	35.9
Overall English	30.3	62.4	32.1	29.0	63.7	34.7
Numeracy						
Basic Numeracy	46.2	75.8	29.6	46.3	77.1	30.8
Advanced Numeracy	43.2	75.1	32.0	42.0	76.6	34.6
Overall Numeracy	45.1	75.6	30.4	44.8	76.9	32.1

Table 16: Within group gender differences in component scores at baseline and endline for Non-CBE

	Non-CBE (Female)			Non-CBE (Male)		
Component Scores	**Baseline mean percent score (%)**	**Endline mean percent score (%)**	**Change in score (% points)**	**Baseline mean percent score (%)**	**Endline mean percent score (%)**	**Change in score (% points)**
Local language						
Basic local language	13.3	42.5	29.2	15.5	43.7	28.2
Advanced local language	17.5	54.6	37.1	19.5	51.8	32.3
Overall local language	19.3	52.4	33.2	21.2	51.3	30.1
English						
Basic English	22.0	51.2	29.2	23.3	52.6	29.3
Advanced English	31.9	64.1	32.1	31.7	64.1	32.3
Overall English	29.7	59.9	30.2	30.1	60.3	30.2
Numeracy						
Basic Numeracy	44.8	73.4	28.6	45.3	73.2	27.8
Advanced Numeracy	42.9	72.7	29.7	42.5	72.7	30.3
Overall Numeracy	44.2	73.1	29.0	44.3	73.0	28.7

Appendix B

Table 17: Linear regression models estimating CBE' impact on learning progress (Female subgroup analysis)

	Overall Local Language (Female)			Overall English (Female)			Overall Numeracy (Female)		
Variables	**M1 Raw**	**M2 Controls**	**M3 Matched**	**M4 Raw**	**M5 Controls**	**M6 Matched**	**M7 Raw**	**M8 Controls**	**M9 Matched**
Time	33.17***	33.38***	32.32***	30.21***	31.97***	30.21***	28.97***	31.03***	30.63***
CBE	6.83***	7.48***	-0.01	0.65	1.19	0.65	0.97	2.48	0.46
Time#CBE	-5.11*	-4.09	-0.35	1.93	2.14	1.93	1.47	1.03	2.4
Age		-0.67*			0.28			-0.28	
Grade									
Grade 2 (Reference group)									
Grade 3		4.04*			4.37*			6.87***	
Grade 4		11.75***			10.82***			15.63***	
Grade 5		15.83***			19.11***			20.77***	
Grade 6		21.25***			24.17***			23.91***	
Female									
Language **Asante-Twi (Reference group)**									
Dagaare		-13.02***			-11.91***			-2.64	
Dagbani		-22.08***			-15.62***			-19.06***	
Ewe		-12.54**			2.48			-3.1	
Gonja		-19.27***			-19.68***			-9.19***	
Kasem		-45.97***			-5.98*			-1.57	
Literacy materials at home		-4.72***			5.04***			5.02***	
Access to mother tongue		6.50***			-1.54			3.05**	
Non-attendance		0.08			0.09			-1.38***	
Household size		0.48***			0.24*			0.16	
Literacy activity at home		13.00***			13.46***			7.25***	
Numeracy activity at home		-1.65			-3.66**			-1.82	
Work outside home		-11.00***			-4.48***			-0.76**	
Wealth index									
Low (Reference group)									
Mid-Low		-1.43			0.74			-0.18	
Mid-High		0.22			0.19			0.18	
High		-0.06			1.87			0.94	
Constant	19.27***	28.20***	20.44***	29.65***	16.40***	29.65***	44.17***	33.47***	43.97***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Appendix C

Table 18: Linear regression models estimating CBE' impact on learning progress (Male subgroup analysis)

	Overall Local Language (Male)			Overall English (Male)			Overall Numeracy (Male)		
Variables	**M1 Raw**	**M2 Controls**	**M3 Matched**	**M4 Raw**	**M5 Controls**	**M6 Matched**	**M7 Raw**	**M8 Controls**	**M9 Matched**
Time	30.12***	31.01***	29.08***	30.21***	31.76***	31.90***	28.69***	30.31***	30.02***
CBE	4.71**	4.51***	-3.26	-1.13	-0.25	-1.01	0.45	0.82	-2.12
Time#CBE	1.29	0.15	5.67	4.48	4.07	2.7	3.45	3.1	4.46
Age		0.41			0.33			0.02	
Grade									
Grade 2 (Reference group)									
Grade 3		6.27***			6.87***			7.97***	
Grade 4		15.68***			17.04***			16.91***	
Grade 5		16.30***			21.76***			20.91***	
Grade 6		20.65***			29.81***			24.66***	
Female								0	
Language **Asante-Twi (Reference group)**									
Dagaare		-12.16***			-8.10***			-1.71	
Dagbani		-19.97***			-13.23***			-18.85***	
Ewe		-3.56			10.74**			-0.05	
Gonja		-11.07***			-11.60***			-7.34***	
Kasem		-47.62***			-3.94			2.09	
Literacy materials at home		-1.07			5.47***			5.75***	
Access to mothertongue		7.35***			-1.92			3.75***	
Non-attendance		-0.08			0.53			-0.61	
Household size		0.22			-0.03			0.18	
Literacy activity at home		11.33***			12.64***			6.45***	
Numeracy activity at home		0.13			2.19			1.25	
Work outside home		-9.74***			-5.89***			-3.94***	
Wealth index									
Low (Reference group)									
Mid-Low		2.51			1.39			0.00	
Mid-High		0.83			-1.18			-2.01	
High		1.58			-1.78			-2.79*	
Constant	21.19*	13.58***	24.45***	30.09***	9.57*	29.96***	44.31***	30.02***	45.60***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Appendix D

Table 19: Linear regression models estimating CBE' impact on learning progress (Grade 3 and below subgroup analysis)

	Overall Local Language (Grade 3 and below)			Overall English (Grade 3 and below)			Overall Numeracy (Grade 3 and below)		
Variables	**M1 Raw**	**M2 Controls**	**M3 Matched**	**M4 Raw**	**M5 Controls**	**M6 Matched**	**M7 Raw**	**M8 Controls**	**M9 Matched**
Time	34.20***	34.82***	32.80***	35.86***	36.72***	36.32***	32.55***	33.52***	33.01***
CBE	5.82***	6.27***	0.00	-0.08	0.09	-1.79	-1.43	-0.89	-4.01*
Time#CBE	-0.79	-1.23	2.96	3.73	3.74	2.91	5.21*	5.79**	7.07**
Age		-0.78*			0.24			0.15	
Grade									
Grade 2 (Reference group)									
Grade 3		5.84***			5.97***			7.45***	
Female		-0.83			1.02			-1.08	
Language									
Asante-Twi (Reference group)									
Dagaare		-6.35*			-4.51			0.4	
Dagbani		-20.10***			-8.47**			-18.04***	
Ewe		-5.61			14.75***			1.91	
Gonja		-6.50*			-5.41			-8.69**	
Kasem		-39.15***			-2.57			4.52	
Literacy materials at home		-5.88***			-0.99			-0.45	
Access to mothertongue		4.55***			-1.87			2.77*	
Non-attendance		0.84*			1.14**			-0.46	
Household size		0.27			0.24			0.24	
Literacy activity at home		13.95***			15.48***			9.63***	
Numeracy activity at home		-2.2			-2.89*			-1.24	
Work outside home		-8.46***			-5.15***			-5.15***	
Wealth index									
Low (Reference group)									
Mid-Low		-0.21			-0.21			-1.33	
Mid-High		-2.07			-2.21			-1.56	
High		-1.62			-1.64			-0.2	
Constant	20.16***	25.78***	12.87***	29.86***	8.38	16.87***	44.23***	31.01***	33.88***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 20: Linear regression models estimating CBE' impact on learning (Grade 4 and above subgroup analysis)

	Overall Local Language (Grade 4 and above)			Overall English (Grade 4 and above)			Overall Numeracy (Grade 4 and above)		
Variables	**M1 Raw**	**M2 Controls**	**M3 Matched**	**M4 Raw**	**M5 Controls**	**M6 Matched**	**M7 Raw**	**M8 Controls**	**M9 Matched**
Time	30.28***	30.39***	29.36***	26.26***	28.28***	28.56***	26.34***	28.60***	28.34***
CBE	7.31***	6.36***	-2.53	1.03	1.07	-0.25	3.86**	3.82**	1.92
Time#CBE	-2.77	-2.97	1.96	3.2	2.21	2.49	-0.18	-1.19	0.45
Age		0.15			0.14			-0.3	
Grade									
Grade 4 (Reference group)									
Grade 5		2.41*			6.34***			4.58***	
Grade 6		6.34***			13.03***			8.00***	
Female		-2.34*			-2.07*			-1.39	
Language									
Asante-Twi (Reference group)									
Dagaare		-15.01***			-10.02***			-3.40**	
Dagbani		-19.76***			-16.69***			-19.22***	
Ewe		-6.31			2.33			-5.59	
Gonja		-23.96***			-23.24***			-7.81***	
Kasem		-48.18***			-4.88*			-1.55	
Literacy materials at home		-1.81			9.47***			9.00***	

Access to mothertongue		8.70***			-1.11			3.59***	
Non-attendance		-1.42**			-1.15**			-1.50***	
Household size		0.44***			0.11			0.11	
Literacy activity at home		11.59***			12.71***			6.34***	
Numeracy activity at home		-0.84			0.36			-0.32	
Work outside home		-11.94***			-4.80***			0.17	
Wealth index									
Low (Reference group)									
Mid-Low		2.04			2.2			1.04	
Mid-High		3.51**			2.11			0.44	
High		2.34			1.83			-0.73	
Constant	25.66***	32.70***	29.37***	39.31***	28.06***	39.84***	52.12***	48.54***	52.90***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Appendix E

Figure 13: Revised Theory of Change for the CBE Programme